

THE MEDICAL JOURNAL OF AUSTRALIA

VOL. I.—17TH YEAR.

SYDNEY, SATURDAY, MAY 3, 1930.

No. 18.

Authors of articles submitted for publication are requested to read the following instructions and to comply with them.

All articles must be typed with double or treble spacing. Carbon copies should not be sent. Abbreviations should be avoided, especially those of a technical character at times employed in ward notes. Words and sentences should not be underlined or typed in capitals. The selection of the correct type is undertaken by the Editors. When illustrations are required, good photographic prints on glossy gastight papers should be submitted. Each print should be enclosed in a sheet of paper. On this sheet of paper the number of the figure and

the legend to appear below the print should be typed or legibly written. On no account should any mark be made on the back of the photographic print. If no good print is available, negatives may be submitted. Line drawings, graphs, charts and the like should be drawn on thick, white paper in India ink by a person accustomed to draw for reproduction. The drawings should be large and boldly executed and all figures, lettering and symbols should be of sufficient strength and size to remain clear after reduction. Skiagrams can be reproduced satisfactorily only if good prints or negatives are available. The reproduction of all illustrations, but especially of skiagrams, entails the sacrifice of

time and energy and is expensive. Authors are expected to take a corresponding amount of trouble on the preparation of their illustrations, whether skiagrams, photographs, wash drawings or line drawings. The references to articles and books quoted must be accurate and should be compiled according to the following scheme. The order should correspond to the order of appearance in the article. The initials and surnames of the authors, the full title of the article or book, the full (unabbreviated) title of the journal in which the article appears, the date of the issue (day, month and year) and the number of the first page should be given in this sequence.

Table of Contents

[The Whole of the Literary Matter in THE MEDICAL JOURNAL OF AUSTRALIA is Copyright.]

ORIGINAL ARTICLES—	PAGE.	CURRENT COMMENT—	PAGE.
"The Diagnosis and Treatment of Chronic Bronchiectasis," by EUSTACE RUSSELL, M.D., M.R.C.P.	570	The Carbohydrate Content of Foods	590
"A Stable Hypochlorite Solution: Bactericidal Power of Some Antiseptics in Common Use," by R. L. RAYMOND, B.A., M.B., Ch.M., F.R.C.S., and E. Q. MANNING, Ph.C.	574	Acute Tonsillitis	591
"Mortality from Heart Disease as Revealed by Post Mortem Statistics," by J. BURTON CLELAND, M.D.	579	ABSTRACTS FROM CURRENT MEDICAL LITERATURE—	
"Nitrogen Peroxide from the Mechanical Rectifiers of a Deep X Ray Therapy Plant," by ROLLO K. NEWMAN, B.Sc., A.A.C.I.	581	Bacteriology and Immunology	592
"The Surgical Importance of Osteomata of the Lower End of the Femur," by ROY HUCKELL, M.D., Ch.B., F.C.S.A.	582	Hygiene	592
REPORTS OF CASES—		BRITISH MEDICAL ASSOCIATION NEWS—	
"Addison's Disease: Absence of the Right Suprarenal Gland with Atrophy of the Left Suprarenal," by R. J. WRIGHT-SMITH, M.D., B.S.	583	Scientific	594
"Non-Rotation of the Mid-Gut Causing Symptoms in a Child," by J. SHEDDEN DAVIS, M.D.	585	MEDICAL SOCIETIES—	
"Obstruction of Small Intestine," by J. COLVIN STOREY, M.B., Ch.M., F.R.C.S., F.C.S.A.	586	The New South Wales Medical Union	596
REVIEWS—		POST-GRADUATE WORK—	
Growth and Nutrition	588	Post-Graduate Course at Brisbane	596
LEADING ARTICLES—		CORRESPONDENCE—	
The Mental Hygiene Movement	589	The Aetiology of Rodent Ulcer	597
		OBITUARY—	
		Albert Edward Brady	598
		CORRIGENDUM	598
		DIARY FOR THE MONTH	598
		MEDICAL APPOINTMENTS	598
		MEDICAL APPOINTMENTS VACANT, ETC.	598
		MEDICAL APPOINTMENTS: IMPORTANT NOTICE	598
		EDITORIAL NOTICES	598

THE DIAGNOSIS AND TREATMENT OF CHRONIC BRONCHIECTASIS.¹

By EUSTACE RUSSELL, M.D. (Edin.), M.R.C.P. (Edin.),
Honorary Physician, Brisbane Public Hospital,
Brisbane.

I HAVE found it somewhat difficult to make up my mind as to what subject to present at this meeting and indeed there are so many interesting matters about which one might talk, that, in choosing the subject of bronchiectasis, one might almost be accused of flogging a dead horse or at least of using valuable time which might more profitably be used.

I am tempted to deal with bronchiectasis more or less at length because I have seen in the last few weeks several cases of the disease and I have been impressed with the frequency of the disease amongst us. Further, I had an opportunity recently of seeing a number of patients undergoing investigation and treatment and I was much impressed with the value of the procedures adopted and I propose to outline most of these to you as I go along.

It is difficult to give a definition of bronchiectasis, that is, a definition which would be acceptable to everybody, as I take it that most of us have as mental picture of the condition that state which has the characteristic features of the disease: foul expectoration in copious amount, clubbing of the fingers and absence of tubercle bacilli in the sputum, whereas really by the time these classical symptoms have developed, the condition is very far advanced and has in some instances been chronic for at least years. Often enough there are many attacks of bronchitis and these are the essential outcome of the bronchiectasis and if these attacks of bronchitis were recognized as the effect of the disease and not the cause of it, more could be done to check the disastrous sequelæ which invariably follow in the train of the complaint.

I will have something to say on the subject of prophylaxis later on; suffice it for the moment that it is my mind that bronchiectasis is in the main a preventible disease.

I think it would be possible for almost any medical man in active practice for a few years to recall cases in which he followed the development of a classical bronchiectasis and if he thought hard enough about them he would be able to discover how he had erred in the initial treatment. I will pass over the morbid anatomy and deal for a moment with the means by which bronchiectasis is brought about.

ÆTIOLOGY.

These considerations are largely based on theory and actually the method of production nor the rationale of its extension are not understood. One factor stands out and it is that before the disease can arise, there must be a weakening of the

bronchial wall, no matter what the cause of that weakening is.

Outstanding amongst the factors are, firstly, infections of the bronchi. It may be a purely local infection, as with a foreign body lodged in a bronchus, or there may be a generalized bronchitis and an involvement of a large area of the bronchial tree. Then again the retention of secretions, from whatever cause, lowers the resistance to infection and aids destruction. Thirdly, in actual obstruction of a bronchus by a foreign body or a tumour the distal part of the bronchus is affected.

Pulmonary fibrosis is probably one of the commonest causes, if not actually the most frequent cause, of the weakness of the bronchial tubes and this is more than likely due to a loss of resiliency of the pulmonary tissue and a consequent super-added infection of the bronchial tube. It is, I think, likely that the pulmonary fibrosis which leads to this result is that which follows unresolved pneumonia of various sorts, either lobar or of the bronchial type, and it matters very little whether the pneumonia is primary or secondary; in the latter group the most important are the sequelæ of infectious diseases, particularly whooping cough and measles, or of the inhalation type after operations about the nose and throat.

Chronic cough is, of course, a very material factor in the further development of the disease and here perhaps there is the operation of a vicious circle in which the disease *ipso facto* produces a cough and the cough aggravates the disease.

Finally, there may be a congenital factor in some cases, but to try to explain the disease on this hypothesis appears to be far fetched and unlikely; at the same time congenital bronchiectasis has been described.

There are various ætiological considerations to be thought of. For the purpose of this discussion these include bronchiectasis due to tuberculosis which causes at least 50% of all bronchiectasis, and those other cases which are due to obvious factors, such as pressure of caseous glands or tumours, impacted foreign bodies, a very much rarer cause than generally alleged, or anthracosis.

Infection about the naso-pharynx and the air sinuses must be remembered as a possible ætiological factor in the production of the disease and it must not be forgotten that operations on the upper air passages may also be a cause by bringing about infection of the bronchi, as mentioned above. And again it must not be forgotten that there is considerable doubt as to the genesis of a bronchiectasis from an accessory sinus infection or whether the accessory sinus infection is not due to the bronchiectasis.

DIAGNOSIS.

Clinical History.

I do not think there is any condition in which the importance of proper and intelligent case taking can be brought out. I have stressed the value

¹Read at a meeting of the Queensland Branch of the British Medical Association on March 7, 1930.

of full and thorough inquiry in every instance, even in this place, and the number of cases of the disease under consideration missed for want of thorough consideration must be legion. I do not mean to infer that the diagnosis of an early bronchiectasis is easy, nor that the diagnosis of a well developed condition needs the exercise of much mentality; suffice it that the history of the patient as in pulmonary tuberculosis is often of more value than the physical examination. Let us take a fairly typical case. The patient very often is a child. I have seen so many children who have been exposed to irritating fumes or who have swallowed irritant poisons, develop symptoms of chest disease that I invariably ask, if the patient is a child suffering from a chronic cough, if there is a history of poisoning. The child as a rule complains of a cough, severe at times and tending to be paroxysmal, which occurs at intervals through the day and which is worse in the morning on rising. There is a history of a copious expectoration accompanying the cough and the sputum is purulent. Often there is a history of several attacks of "pneumonia," but more often a series of attacks of bronchitis has been correctly diagnosed. The full significance of the condition, however, is lost in the inability to focus attention on the major condition, the acute attack being merely symptomatic. In some cases there may be pain due to actual pleurisy and there is almost always a rise in temperature.

The child may give a history of hæmoptysis and this occurs usually as a mere tingeing of the sputum with blood and is very likely to be overlooked. In regard to the general symptoms of bronchiectasis, little need be told you, as they are familiar to you, but it may be well to emphasize that in no complaint can one judge the book less by the cover, so to speak, than in this one and, excepting for a little paleness, there may be no obvious sign of illness and indeed the patients as a rule present no sign of ill health.

The enormous amount of sputum will draw attention to the possibility of the disease and the almost invariable sweetly foul odour will give impetus to the same idea, not that the sputum is always foul. The absence of tubercle bacilli will give further evidence.

One matter of importance is the inevitable persistence of symptoms and signs without fever and without ill health and there is a periodicity of the symptoms which is almost characteristic.

Physical Signs.

Physical signs depend very largely upon the development of the disease. There may be so few as to render the diagnosis impossible from them alone or they may be so extensive as to make the non-diagnosis well nigh impossible.

In unilateral bronchiectasis the limitation of movement on the affected side may be well marked and there is usually some flattening. If there be well developed fibrosis of the lung, displacement of the heart to the affected side may be made out. The

vocal fremitus is as a rule impaired and the percussion note is flattened. The sounds heard on auscultation vary considerably in the course of development of the disease and may be a mere series of râles or may be a full amphoric breathing and even the latter vary according to whether the cavity be full or empty. In early bronchiectasis the râles may for a time disappear, but they tend to recur and their reappearance in the same affected area points very much to an affection of the part.

Clubbing of the fingers and toes may be a moderately early sign of bronchiectasis, not so early as in empyema, but very much earlier than in very extensive bronchiectasis due to pulmonary tuberculosis.

Further Investigation.

Laboratory Findings.

In all cases there should be an examination of the sputum for tubercle bacilli on several occasions, at least three, and the fæces should also be investigated for the same organism. The absence of tubercle bacilli and the absence of elastic tissue from the sputum point strongly to the presence of bronchiectasis.

Radiological examination may be of little value in early bronchiectasis from a diagnostic standpoint, but its value is really apparent when there is any doubt about the resolution of a pneumonia and I would urge practitioners to use radiology as a routine in those cases presenting any doubt after a reasonable time for the clearing up of the lesion has been allowed to elapse. In this way an early bronchiectasis may be checked by a proper appreciation of the pathology of the case and is invaluable in prophylaxis. X rays will as a rule reveal the presence of fibrosis or a foreign body and demonstrate the movement of the diaphragm. A cavity is easily seen. A stereoscopic photograph is of much more value than a simple film and its greater detail enhances its value.

I am strongly of the opinion that in all doubtful chest conditions radiography should be used and, when at all possible, a routine examination should be made, just as a Wassermann blood test is carried out and, it is to be hoped soon, an electrocardiographic record made in heart conditions.

"Lipiodol" and X Rays.

Examination by "Lipiodol" and X rays is very much more valuable and very much more necessary than the mere radiological investigation and in early bronchiectasis is indispensable.

I do not think it is necessary for me to enter into a description of "Lipiodol" or of its composition, still I would say that, since it is a preparation of iodine, it is possible that there may be an idiosyncrasy to it and I have seen two patients intolerant of it. It is wise, I think, to give a few doses of iodide of potassium or sodium, the latter preferably, before subjecting the patient to a "Lipiodol" investigation, in order to test his

sensitivity and to avoid unpleasantness to him. There are three ways of introducing "Lipiodol" into the bronchial system:

1. By the mouth. This is a very uncertain way of doing the operation and, successful as the method may be in the hands of certain operators, the drug is much more likely to find itself in the stomach than in the respiratory tract. It is not to be recommended.

2. By the intratracheal method. This is the method of choice and is simple enough to be used by any practitioner. It simply consists of introducing into an anaesthetized trachea about twenty cubic centimetres of "Lipiodol," the patient being propped up on a couch and turned to the side to be investigated.

3. By direct introduction into the bronchus. This requires the skill of an expert technician in bronchoscopy and is not available to the general run of practitioners. It seems to me to be the most convincing method of investigation.

The real value of the combined X ray and "Lipiodol" investigation lies not merely in the demonstration of the presence of bronchiectatic cavities in those patients showing few physical signs, but it will also demonstrate the difference between bronchiectatic and abscess cavities and, further, will localize for surgical purposes those cavities which are amenable to such treatment.

TREATMENT.

It would be dishonest to say that at the present moment the treatment of bronchiectasis is satisfactory. I would go further than that and say that in spite of treatment there is very little alleviation of the distressing symptoms of the disease and that the futility of treatment, except what is palliative, is one of the black marks against us.

Prophylactic Treatment.

One of my objects in giving this paper is to point out the importance of the prevention of bronchiectasis and if I accomplish no other object than to draw attention to the possible prevention of a prevalent disease amongst us, I will feel that I have done something worth while.

I do not think any medical man who has been in active practice here, will doubt the extraordinary incidence of the disease amongst us and I do not think that he will excuse himself, if I say that it is possible that that incidence is due to his inability to recognize the factors which are potent in the aetiology of the disease. I am perfectly sure we will be told that there are many cases of the disease which are due to infection about the upper air passages and I am just as sure we will be told that patients thus affected can be cured by the removal of the offending foci. And I am prepared to admit that isolated cases of infection of the upper air passages may cause bronchiectasis and I have seen patients affected by what appeared to be bronchiectasis, relieved by the removal of foci, but the really

important matter which I wish to stress, is the incidence of the disease due to the neglect of the convalescent stages of lobar and bronchopneumonia.

I think that the prevention of the disease is so important that I could have spent a very considerable portion of the time allotted to me on the discussion of that point and I would commend that discussion seriously to your future consideration.

If one only considers the unfortunate children who are hurried out of hospital from reasonably salubrious surroundings to stuffy homes, and those who have delayed resolution from convalescent homes, if any, to hard work and possible poverty, then we can visualize the development of a weakness of the bronchial wall due to various factors already enumerated and can trace their progress from the child or youth with a cough to the adult with a repulsive breath and an unrelieved invalidity.

I would plead for a more extensive development of the convalescent home, for a more extensive thought in the matter of rest for the patients with pneumonia and bronchopneumonia and a proper follow-up of all these patients to exclude the possibility of development of unpleasant features.

I have spoken very seriously to my colleagues here about the establishment of tuberculosis clinics and I think the time is just as ripe for the establishment of non-tuberculosis respiratory clinics in which all patients leaving the hospitals may be followed up and suitably treated. Further, in regard to prophylaxis it is important to point out the necessity for general treatment of patients recovering from pneumonia, for the use of diathermy for those whose pneumonia does not resolve, and for the proper nourishment, resting and exercising of those whose pneumonia is in the process of resolution.

Medical Treatment.

I have already mentioned some matters pertaining to medical treatment, but it is well to emphasize the necessity for rest in cases of bronchiectasis with fever and the necessity for removal of all possible foci of infection. In children particularly the removal of tonsils and adenoids should be insisted upon and, if there proves to be any infection of the air sinuses, these also should be dealt with. Septic teeth may be the prime factor in the infective process and should be removed, but the wholesale removal of teeth without sufficient evidence is strongly to be deprecated.

Vaccine treatment is of some use in selected cases and I have noticed in my experience the extraordinary tolerance of these patients for vaccines, due, I think, to the attenuated nature of the offending organism. Colloid injections have been and possibly are fashionable, but they are of doubtful value and the same applies to the injection of iodine and iodoform solutions.

Postural Treatment.

Postural treatment is possibly the most valuable and most commonsense of all the medical forms of treatment and is in most cases the only way in

which the axiom, "When you see pus, let it out," can be satisfied.

The Creosote Chamber.

The creosote chamber may be a particularly useful form of treatment and for patients with very offensive breath I have found it of great value. I do not think it is of any use from a curative standpoint, but it certainly gives the patient a feeling of relief which is more relished by his friends.

Inhalation.

Inhalation is used in varying ways and various substances are used and the most that can be said of it is that it is an improvement in the environment in an olfactory sense.

Medicinal Treatment.

The only drugs of any real value in the disease are the iodides and creosote, both of which have their advocates and their disadvantages. Both of them, to be of any use, must be used for a considerable time and may with advantage be prescribed together.

Other drugs have been used, notably guaiacol and sandalwood oil and garlic have their advocates. Sandalwood oil is objectionable on account of its associations and its likelihood for misinterpretation and garlic leaves a very unfavourable impression on the listeners.

Intratracheal Medication.

The use of iodine for diagnostic purposes has been emphasized and it must be mentioned that various suspensions of volatile oils in oil have been and are being used in the treatment of bronchiectasis.

The most useful preparation for the active treatment of the disease is perhaps "Lipiodol" itself and it has been adopted almost universally as the best method of introducing medication into the respiratory tract. It is almost free from contraindication and as the simplicity is obvious in its use, it is possible that an extension of its application may be looked for. It can be used for treatment of both sides at one sitting and the simplicity in application recommends it to the physician.

Surgical Treatment.

It is possible that within the next few years active surgery may be the best means for the treatment of bronchiectasis and it is in my mind that in the comparatively near future these patients will be treated by the active cooperation between the physician and surgeon, each of them with a fullness of knowledge of the condition and that the treatment will be approached, not with a perspective of one or possibly more affected parts, but with a grasp of the condition of the patient as a whole.

It is perfectly obvious, I take it, that there is very little hope of much alleviation of a bronchiectasis once the distortion of the tube has come about and no amount of special pleading and sophistry will convince me otherwise.

There are at least two considerations which make us pause in recommending surgical interference and these two considerations weigh in most matters in our practice. The first is the lack of success and the second is the possible mortality. Still, as I have said, it is likely that with improved technique and the greater knowledge of anæsthetics surgical procedure may be the method and, I think, will be the method of choice; at the same time the prospects of a patient must be considered individually, the primary object being to cure the patient and not to achieve a spectacular success.

There are various ways of treating this condition surgically. In the very early cases the collapse of the lung is the most useful and rational procedure. There are two methods of carrying out this procedure, both based on the same principles and neither of them difficult to carry out nor dangerous to the patient. The main point is to keep the lung in a state of collapse for a longer or shorter period, as a rule for a longer one.

Artificial pneumothorax is the easier and more simple method of bringing the idea into effect. Various gases have been used for this purpose, but atmospheric air is generally now in use and is all that is necessary. The pneumothorax may have to be repeated from time to time in order to maintain the collapse; it may be that one filling may be all that is requisite, but this is exceptional. The apparatus is simple and comparatively inexpensive; indeed the best I have seen belongs to one of my colleagues here. There is little or no danger; the only risk is that of pleural shock and that is a rare and unlikely *contretemps*.

Oleothorax has been substituted for pneumothorax as a means of maintaining the collapse for a period of six months or more and it has its advocates. I saw several patients treated by this means when I was in London recently and radiographically it had much to commend it. The procedure consists in introducing a solution of olive oil impregnated with antiseptic instead of atmospheric air and the idea is to obviate repeated fillings and to maintain a collapse effect for a period of months.

It seems to me that, seeing there is very little danger or difficulty in getting an adequate effect from pneumothorax and the procedure can be controlled by X ray examination, there is little necessity for any modification of it.

Phrenic Avulsion.

Phrenic avulsion is useful in bronchiectasis confined to the bases of the lungs. It insures a collapse of the base and immediately the diaphragm rises to the level of the third rib or thereabouts. It is a perfectly simple operation and causes the patient very little inconvenience; indeed I have seen the patients the day after the operation nothing the worse of their experience. It has the disadvantage of being a destructive and irrevocable measure and it has to be remembered that once the operation is

done, the phrenic nerve is for ever gone and the diaphragm paralysed.

Phrenectomy is not to be recommended and the avulsion must be such as to insure the removal of the nerve with all its innervation or the operation is useless.

The effect of this operation is to give the major portion of the lung rest, particularly the base of the lung, and it is likely that the whole of the lung benefits from the proceeding. The most obvious effect to the onlooker is the diminution in the amount and the fetor of the sputum, but I assure you from personal observation that the result is not always in accordance with the book. And this applies to many similar recommendations.

Thoracoplasty.

It has to be remembered that thoracoplasty is an extensive and grave operation, not merely from the immediate results, but from the fact that as in the operation of phrenic avulsion the irrevocability has to be considered. The results are, of course, not merely permanent, but what is just as important, mutilating.

I need not enter into a description of the various methods of operation which are entirely outside my sphere of activity, but I should like to say that I have seen very daring undertakings of this kind successful and not unsightly.

Drainage.

Drainage has its limitations and is of necessity confined to those cases in which the disease affects the lower lobe and in which the major lesion is a large cavity. It need not be pointed out that a precise knowledge of the size and location of the cavity should be made as certain as possible by the use of "Lipiodol" and X rays immediately before operation and the risks of infection of the pleural cavity and hæmorrhage must be properly appreciated.

Lobectomy.

I think that, surgically speaking, if I may so say, lobectomy would be the ideal method of treating these patients, as indeed it would be for the treatment of hæmoptysis if it were within the sphere of ordinary practice. It is unnecessary to point out the gravamen of such an experiment, still it is within the means of surgery and it is possible that before long the method of choice will lie in this direction, not only with the daring ones, but even as a routine.

Diathermy has been used with success in these cases and it is possible to remove a considerable portion of the lung by this means and still to control the hæmorrhage.

The cautery has been advocated and recently the steam cautery has had a vogue.

There is still a risk in these cases of hæmorrhage and pleural infection and these are the bugbears of the surgeon.

Finally, a method which appears to be very sound, not merely in theory, but in practice, is the one advocated by Martin, the actual drainage and swabbing out of the cavities of bronchiectasis. This is done by means of an aspirating bronchoscope and continuous suction and a washing out and cleansing of the cavity. The results are claimed to be 25% successful and the method is certainly attractive; the drawback, and a very serious one, seems to me that the method requires the combined skill of two men expert in the use of the bronchoscope.

CONCLUSION.

I think I have said enough to give a brief outline of the modern methods in the diagnosis and treatment of bronchiectasis and I hope on you impressed the very great importance in prophylaxis. If only the subject of prophylaxis has been ventilated, I shall feel satisfied that the time has been well and profitably spent.

A STABLE HYPOCHLORITE SOLUTION: BACTERICIDAL POWER OF SOME ANTISEPTICS IN COMMON USE.

By R. L. RAYMOND, B.A. (Oxon), M.B., Ch.M. (Sydney),
F.R.C.S. (Edinburgh),

AND

E. Q. MANNING, Ph.C. (Sydney),
Five Dock, New South Wales.

PART I.

It has been a source of dissatisfaction that the hypochlorite antiseptics, eusol and the later improvement, Dakin's solution, have not been convenient for use in the private surgeries on account of their instability and of the consequent need for frequent renewal of the stock by a competent pharmacist. The difficulty is not so acute in the big hospitals where large quantities are being constantly used and replenished. Experience has shown that these solutions, when prescribed, are dispensed frequently from stock weeks or even months old and even when they are freshly prepared to the same formula, the strength of samples varies considerably.

An attempt to overcome these objections to the hypochlorite solutions has yielded the solution of calcium hypochlorite presently to be described.

The active principle in the hypochlorite solutions is the nascent chlorine derived from hypochlorous acid in eusol (Lorraine Smith⁽¹⁾), from sodium hypochlorite in Dakin's solution and from calcium hypochlorite in our solution. Dakin's solution has proved experimentally to be slightly more bactericidal, rather more stable and considerably less irritant to the tissues than eusol, though even eusol is infinitely more bactericidal and less irritant than the other antiseptics such as mercuric oxycyanide, potassium permanganate, flavine and mercurchrome in the strengths in which they are properly

used on living tissues. Dakin's solution, therefore, is the standard with which the calcium hypochlorite solution will be compared.

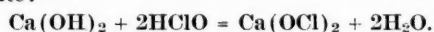
Cheapness of production has, of course, been considered a *sine qua non* for general acceptance of any new solution and on this account such hypochlorite antiseptics as chloramine T. and the proprietary lines such as "Dibromine," "Tolamine," "Milton" *et cetera* do not come into the field for comparison.

Pure hypochlorous acid in solution was the first solution used for experimentation, but it compared in all respects unfavourably with Dakin's solution.

Subsequently the solution of calcium hypochlorite was tried with eminently satisfactory results. It was prepared by passing chlorine gas through a suspension of calcium carbonate with the production of calcium chloride and hypochlorous acid:⁽²⁾



The excess of calcium carbonate was filtered off and the hypochlorous acid neutralized with calcium hydroxide, with the formation of calcium hypochlorite:⁽³⁾



We realize that the correctness of the formula⁽⁴⁾ $\text{Ca}(\text{OCl})_2$ may possibly be called in question, but there is no certainty about the formula and this one seems the most likely.

This leaves a solution of calcium hypochlorite, pure except for the soluble calcium chloride formed in the first stage. A very small amount of calcium carbonate settles to the bottom in the course of time due to the combination of the small excess of calcium hydroxide present, with the carbonic acid in solution. All the carbon dioxide gas will not have been driven off in the first stage of the preparation. This solution of calcium hypochlorite will vary in strength according to the amount of calcium carbonate present at the start and to the length of time the chlorine gas is passed through it. The strongest solutions made by us have contained 3.0% available chlorine.

Eusol and Dakin's solution,⁽⁵⁾ as made by the usual formulae, contain about 0.3% and 0.5% available chlorine respectively, so the calcium hypochlorite solution has been diluted about ten times to correspond in strength. In fact, when we speak of these solutions in the following experiments, a strength of exactly 0.3% available chlorine is implied unless otherwise definitely stated.

All estimations of the available chlorine in these solutions have been done by adding a known quantity to a solution of potassium iodide acidified with hydrochloric acid. Iodine is liberated by the available chlorine and titrated with sodium thiosulphate solution and the amount of available chlorine arrived at by calculation.

Stability.

Dakin's solution, left on a shelf in a cool part of the room, deteriorated from 0.5% available chlorine to about 0.43% (though this reading varied

considerably with different samples) in seven days in moderately warm weather. Brought to the boil and cooled, the available chlorine was about 0.35%. It is recommended by Dakin that the solution should be renewed about every seven days. Professor Priestley, of the Department of Physiology, University of Sydney, has commented to us on this extraordinary variation in the rate of deterioration of Dakin's solution and has pointed out that in his experience samples have occasionally kept unaltered for several weeks. This variation is not explained with certainty, but is probably due to the variable purity of the commercial salts used in the preparation.

Calcium hypochlorite solution does not deteriorate in the least after prolonged standing even in the sunshine. After the solution was boiled, the available chlorine was still 0.3%. After the solution was boiled away to half volume and then made up to full volume with distilled water, the available chlorine was still 0.3%.

The accident of having calcium chloride in the solution is a happy one. It is a highly dissociated salt and has the effect of hindering the dissociation of the calcium hypochlorite, since the latter represents the union of a strong base and a weak acid. Thus the complete stability of the calcium hypochlorite solution is assisted.

Irritant Properties.

Irritability was tested experimentally by binding cotton wool wet with the lotion on the glabrous skin of the upper arm and keeping it wet for twelve hours.

Eusol causes a painful hyperæmia which passes off in about five days.

Dakin's and calcium hypochlorite solution after twelve hours have little or no effect on the skin. A stronger solution—0.58% available chlorine—after two hours causes some hyperæmia in the case of calcium hypochlorite, but none in the case of Dakin's solution.

It has been found that calcium hypochlorite solution, one in sixty, is about the greatest strength that can be tolerated in the urinary bladder without causing frequency of micturition for a few hours afterwards. In this strength it has proved to be a very efficient bladder wash. A one in eighty solution in normal saline solution is a thoroughly bland, highly bactericidal (see experiments below) and clinically efficient irrigation fluid for the nasal cavities and sinuses. Antiseptic lotions for introduction into the nose are few enough.

Bactericidal Power.

In experiments on bactericidal power first subcultures of *Staphylococcus aureus* taken from wounds or septic throats have been used with the idea that these lotions are especially for use in wound sepsis and in this *Staphylococcus aureus* is the common infecting organism.

Five cubic centimetres of lotion have been allowed to act on 0.5 cubic centimetre of living emulsion

Minutes (Contact of Lotion and Emulsion).	Calcium Hypochlorite Solution (1 in 80).				"Solypsol" Solution (1 in 100).					Lysol Solution (1 in 100).					Calcium Hypochlorite Solution (1 in 80) and Lysol Solution (1 in 100).				
	After 3 hours.	After 10 hours.	After 12 hours.	After 13 hours.	After 14 hours.	After 3 hours.	After 10 hours.	After 12 hours.	After 13 hours.	After 14 hours.	After 3 hours.	After 10 hours.	After 12 hours.	After 13 hours.	After 14 hours.				
1	-	-	-	-	-	+	+	+	+	+	.	+	+	+	+				
2	-	-	-	-	-	+	+	+	+	+	-	+	+	+	+				
3	-	-	-	-	-	+	+	+	+	+	-	+	+	+	+				
4	-	-	-	-	-	+	+	+	+	+	-	+	+	+	+				
5	-	-	-	-	-	+	+	+	+	+	-	+	+	+	+				

Minutes (Contact of Lotion and Emulsion).	Calcium Hypochlorite Solution (1 in 80).						Lysol Solution. (1 in 100).						"Solyptol" Solution (1 in 12).						Lysol Solution (1-in 24).												
After 5 hours.	+	+	+	+	+	+	After 5 hours.	+	+	+	+	+	+	After 5 hours.	+	+	+	+	+	After 5 hours.	+	+	+	+	+	After 5 hours.	+	+	+	+	+
After 6 hours.	+	+	+	+	+	+	After 6 hours.	+	+	+	+	+	+	After 6 hours.	+	+	+	+	+	After 6 hours.	+	+	+	+	+	After 6 hours.	+	+	+	+	+
After 7 hours.	+	+	+	+	+	+	After 7 hours.	+	+	+	+	+	+	After 7 hours.	+	+	+	+	+	After 7 hours.	+	+	+	+	+	After 7 hours.	+	+	+	+	+
After 8 hours.	+	+	+	+	+	+	After 8 hours.	+	+	+	+	+	+	After 8 hours.	+	+	+	+	+	After 8 hours.	+	+	+	+	+	After 8 hours.	+	+	+	+	+
After 12 hours.	+	+	+	+	+	+	After 12 hours.	+	+	+	+	+	+	After 12 hours.	+	+	+	+	+	After 12 hours.	+	+	+	+	+	After 12 hours.	+	+	+	+	+
After 15 hours.	+	+	+	+	+	+	After 15 hours.	+	+	+	+	+	+	After 15 hours.	+	+	+	+	+	After 15 hours.	+	+	+	+	+	After 15 hours.	+	+	+	+	+

REFERENCES.

- ⁽¹⁾ J. Lorraine Smith *et alii*: "Experimental Observations on the Antiseptic Action of Hypochlorous Acid and Its Application to Wound Treatment," *The British Medical Journal*, July 24, 1915, page 129.
- ⁽²⁾ Caven and Lander: "Systematic Inorganic Chemistry," 1919, page 292.
- ⁽³⁾ G. S. Newth: "A Textbook of Inorganic Chemistry," 1919, page 374.
- ⁽⁴⁾ J. W. Meller: "Treatise on Inorganic Chemistry," 1922, Volume II, page 257.
- ⁽⁵⁾ H. D. Dakin: "On the Use of Certain Antiseptic Substances in the Treatment of Infected Wounds," *The British Medical Journal*, August 28, 1915, page 318.
- ⁽⁶⁾ H. D. Dakin and E. K. Dunham: "The Relative Germicidal Efficiency of Antiseptics of the Chlorine Group and Acriflavine and Other Dyes," *The British Medical Journal*, November 17, 1917, page 641.

MORTALITY FROM HEART DISEASE AS REVEALED BY POST MORTEM STATISTICS.

By J. BURTON CLELAND, M.D.,

Marks Professor of Pathology, University of Adelaide;
Honorary Pathologist, Adelaide Hospital.

DR. J. COEN⁽¹⁾ has recently contributed to this journal an interesting article dealing with the apparent increase of deaths from heart disease in New South Wales according to the official vital statistics which are based on the death certificates. He points out how unreliable these statistics are. It is obvious that in addition to the inherent difficulty there is in coming to a correct diagnosis as to the cause of death, there is the further error unavoidably resulting from time to time from wrong interpretations put upon the certificate in the Registrar's office by statisticians who only rarely can have had a medical training. We know, and instances have been shown,⁽²⁾ how difficult it often is to form a correct diagnosis as to the cause of death without a complete *post mortem* examination. Even with a complete autopsy we are sometimes at fault and lamely attribute death to cardiac syncope or heart failure, for want of any better explanation. In the nature of things there must be frequent errors in the death certificates and in many cases the real sequence of events and the prime cause of the patient's death may be masked by epiphenomena.

Another aspect to be considered is: "What is heart disease?" This may be better put by considering what lesions are essentially and particularly cardiac. The more important of these come under the following categories: (i) Valvular lesions, chiefly due to rheumatic fever, malignant endocarditis, syphilitic disease of the aortic valve and degenerative (atheromatous) valvular changes. (ii) Interferences with the vascular supply to the muscle due to atheroma of the coronary vessels with or without thrombosis or more rarely to embolism or to obstruction at their orifices by syphilitic aortic disease. Fatty infiltrations and fatty degeneration of the heart are to be looked on as more general conditions only occasionally leading to death from the involvement of the cardiac muscle. (iii) Over-

work of the heart leading to hypertrophy of its muscle, from causes other than organic lesions of the valves. Here the disease is originally extra-cardiac, usually leading to high blood pressure; it may be of renal origin or it may be an essential hyperpiesis or it may be on the right side, due to chronic bronchitis and emphysema. Hypertrophy of the muscle takes place which is a physiological response to the increased work required. Eventually the hypertrophied muscle is unable to meet the demands made on it and the heart dilates and quickly fails. A patient with fibroid phthisis or chronic emphysema whose right heart finally fails, should hardly be classed as having died from heart disease. A patient with chronic interstitial nephritis usually dies in one of three ways—from uræmia, from failure of the hypertrophied heart or from cerebral hæmorrhage from the high blood pressure. We attribute these deaths to renal disease, heart disease and cerebral hæmorrhage respectively, though the prime cause in all three would seem to be renal. There is the further complication that high blood pressure with its cardiac and cerebral consequences in many cases is evidently not of renal origin. In any case this third category is clearly a secondary cardiac condition, it is not a true primary heart disease.

It is possible that *post mortem* statistics may be able to give us a truer picture of the present position. For the last ten years at the Adelaide Hospital very complete autopsy records have been kept and the information obtained from them has been entered under the various pathological lesions met with. Thus every case with pericarditis will appear under this heading, together with any other pathological changes present. The results have been summarized a thousand at a time, the second thousand having just been completed. The details of the first thousand have been published in the *Medical and Scientific Archives of the Adelaide Hospital* for the years 1926, 1927 and 1928. The vascular system findings will be found in the archives for the year 1927. Copies of the archives are obtainable from the Adelaide Hospital. The details of the second thousand will appear in the archives for 1929 and succeeding years.

We thus have for consideration data on *post mortem* examinations on two thousand persons, mostly adults, who have died at the Adelaide Hospital. A *post mortem* examination is carried out in every case in which permission can be obtained. Most of the patients are over forty and autopsies on men are about three times those on women. Nevertheless we may consider that in a general way the results we have obtained indicate the prevalence of the various lesions met with in the adult population of Adelaide at death.

The following is a summary of the lesions of the vascular system in these two series. The higher figures under some items in the second thousand are to be attributed in part to greater accuracy in tabulating in the summaries of the *post mortem*

examinations lesions that were present but were not of special importance as a cause of death. The true frequency of the various lesions is probably, therefore, more accurately indicated in the second thousand and the insertion of the decimal point at once converts these into percentages.

Lesion.	First Thousand.	Second Thousand.
Pericarditis	27	22
Adherent pericardium	7	26
Rheumatic valvular disease	18	28
Malignant endocarditis	20	24
Valvular disease, not rheumatic, malignant or syphilitic	26	30
Hypertrophied heart plus chronic interstitial nephritis	74	65
Hypertrophied heart plus interstitial renal changes in young persons	—	3
Hypertrophied heart, renal lesions slight or none	30	62
Congenital defects of the heart	7	5
Heart block, auricular fibrillation (as revealed in the histories)	4	20
Lesions of the myocardium	19	36
Infarcts of the heart wall	13	31
Acute mortem clots in the heart	12	—
Bleed thrombus in heart	1	—
Other heart lesions	10	15
Syphilitic aortitis alone	9	18
Syphilitic aortitis with disease of the aortic valve	6	10
Aneurysm of the aorta	21	17
Atheroma	80	139
Infarcts	53	77
Thrombosis	15	31
Massive pulmonary embolism	15	9

Let us discuss these lesions *seriatim*.

Pericarditis.

Pericarditis is usually either simple, as in cases of rheumatic fever, terminal, as in some forms of Bright's disease, or secondary to pneumonia. In most instances the patient's death is to be attributed to these other conditions and not primarily to the pericarditis. About 2.45% of adults have pericarditis present at death.

Adherent Pericardium.

Probably over 2% of adults at death have an adherent pericardium, usually a complete *synechia pericardii*, the result of an old pericarditis. Only occasionally, when there are mediastinal adhesions as well, is such an adherent pericardium itself the cause of much cardiac hypertrophy with final failure.

Valvular Disease.

In the four forms tabulated, the valvular disease may be considered nearly always as the actual cause of death. All the patients with malignant endocarditis, with rare exceptions, died from this disease, accounting for about 2.2% of adult deaths. About 2.3% have old rheumatic valvular lesions and most of these have eventually died therefrom. In addition in many of the cases listed under malignant endocarditis this condition was grafted on to a rheumatic basis, so that the actual number of patients with rheumatic valvular lesions is higher than this 2.3%. About 0.8% have syphilitic disease of the aortic valve through extension from a

syphilitic aortitis and these mostly die therefrom. The 2.8% who have valvular disease, not rheumatic, malignant or syphilitic, mostly have atheromatous changes or knobby calcified deposits. Some of the latter probably represent the aftermath of a sub-acute malignant endocarditis in which the organisms have finally been overcome. Probably the majority of the patients under this category did not die from the cardiac lesion.

Other Cardiac Conditions.

Nearly 7% have more or less hypertrophied hearts and obvious fibrotic changes in the kidneys, though of varying degrees. An analysis of the 65 cases in the second series shows that in 17 (1.7% of the thousand) there was evidence of failure of the hypertrophied heart, leading usually to death, in 15 (1.5%) the patient died of cerebral hæmorrhage, in eight (0.8%) from uræmia and in 25 (2.5%) the lesions in the heart or the kidneys were either not extensive or the patient died from some other cause not immediately related to the cardiac and renal conditions.

As regards hypertrophy of the heart without renal fibrosis or with insignificant changes in the kidneys, the figure of 62 (6.2%) in the second series may be taken as being more exact than the 30 in the first series. In the latter lesser degrees of hypertrophy were probably not tabulated. Dealing with the second series, we find that in 29 (2.9%) the hypertrophied heart failed, the patient dying in most instances directly from the cardiac condition. Most of these cases are probably to be considered as originating in essential hyperpiesis. We thus find that of 46 persons (4.6% of the thousand) dying from failure of their hypertrophied hearts, the hypertrophy being mostly the result of high blood pressure, 17 (1.7%) had fibrotic changes in the kidneys and 29 (2.9%) had the hypertrophy without renal changes. It would thus appear that in the majority of these patients with high blood pressure and hypertrophied hearts, the kidneys were relatively sound and not obviously responsible for the high blood pressure.

In seven (0.7%) of the second series the patients with cardiac hypertrophy without renal changes died from cerebral hæmorrhage, whereas we find that 15 (more than twice as many) with cardiac hypertrophy and renal fibrosis died from this cause. In seven (0.7%) right heart failure had resulted from pulmonary embarrassment. In 19 (1.9%) the cardiac hypertrophy was found not to be associated with the cause of death.

These results may be more clearly seen if tabulated thus:

Hypertrophied Heart with Interstitial Renal Changes (Second Series).

Failure of the hypertrophied heart	17 (1.7%)
Death from cerebral hæmorrhage	15 (1.5%)
Death from uræmia	8 (0.8%)
Death due to other causes	25 (2.5%)

Total 65 (6.5%)

*Hypertrophied Heart without Obvious Renal Changes
(Second Series).*

Failure of the hypertrophied heart ..	29 (2.9%)
Death from cerebral hæmorrhage ..	7 (0.7%)
Right heart failure	7 (0.7%)
Death due to other causes	19 (1.9%)
Total	62 (6.2%)

Degenerative myocardial lesions were detected in about 3.4% of the two series and may be looked on as frequently causing the patient's death, as for instance where infarcts occur.

Syphilitic aortitis was present in just over 4% of the joint series. When present alone, it did not usually lead to death. When it extended to the aortic valve (this aspect has already been considered) or gave rise to an aneurysm, death usually resulted therefrom in the end; 1.9% of the two series had aneurysms, nearly all of syphilitic origin.

Atheromatous changes necessarily increase with age. The degree of change varies in different parts. We may find extensive changes in the aorta or coronary vessels or cerebral vessels without any one of these being accompanied by any of the others or, on the other hand, all these areas may be affected together. An analysis of the 139 (13.9%) cases in the second series, in which atheromatous changes were sufficiently evident to entitle them to a place in the summary, shows that the coronary vessels were specifically noted as being affected in 50 (5% of all cases). In only 16 of these were the patients under sixty years of age, eleven being men and five women. Of the eleven men four were under 50 (42, 44, 45 and 49 respectively). The five women were 50 or more. Such coronary atheroma is apt to lead to changes in the myocardium whose lesions have already been considered. In three deaths from *angina pectoris* coronary atheroma was recorded.

In 6.5% of the two thousand infarcts were present in one or other organ. These infarcts are the extension of disease in other parts, being mostly due to emboli from malignant endocarditis or to detachment of portions of *ante mortem* clots in the recesses of the ventricles or auricles associated usually with cardiac dilatation. In the second series there were 31 examples (3.1%) of such *ante mortem* clots in the heart.

Thrombosis in veins and massive pulmonary embolism do not concern us in this review.

Summary of the Cardiac Lesions Responsible for Death.

The lesions of the pericardium are rarely alone responsible. Old rheumatic valvular disease is responsible for about 2.3% of deaths, malignant endocarditis for 2.2% and syphilitic disease of the aortic valve for about 0.8%. If we allow 1.6% for other valvular lesions causing death, probably a generous estimate, we can put down the total deaths from valvular disease as 7%. Failure of hypertrophied hearts associated with chronic renal changes accounts for 1.7% (*vide* second series) and similar failure but without renal changes for 2.9%, a total of 4.6%.

Degenerative changes in the myocardium, usually due to coronary atheroma, may be set down as causing death in under 3%. Aneurysms account for about 1.9% of deaths. These may be tabulated as follows:

*Approximate Causes of Deaths in Adults at the
Adelaide Hospital.*

Valvular disease in its various forms ..	7.0%
Failure of hypertrophied hearts from renal fibrosis or essential hyperpiesis	4.6%
Degenerative myocardial changes, under	3.0%
Aneurysm	1.9%
Total	16.5%

Thus about 16.5% of our deaths, as revealed by *post mortem* examinations, can reasonably be attributed to heart disease in its various forms. At the same time we find that in the second series 12.8% of patients had malignant growths, most of whom died therefrom, 9.2% had advanced pulmonary tuberculosis and 1.8% died from other forms of tuberculosis and 10.7% died as a result of accidents.

References.

- ¹ J. Coen: "Observations on the Mortality from Heart Disease in the State of New South Wales," *THE MEDICAL JOURNAL OF AUSTRALIA*, January 25, 1930, page 111.
- ² J. B. Cleland: "Vital Statistics in the Light of Post Mortem Findings," *THE MEDICAL JOURNAL OF AUSTRALIA*, November 13, 1926, page 664.

**NITROGEN PEROXIDE FROM THE MECHANICAL
RECTIFIERS OF A DEEP X RAY
THERAPY PLANT.¹**

By ROLLO K. NEWMAN, B.Sc., A.A.C.I.,
Sydney.

For various reasons information was required concerning the nitrogen peroxide content of the atmosphere in the room containing the mechanical rectifiers of the deep X ray therapy plant in the Royal Prince Alfred Hospital. The first method of estimation tried consisted in treating a four litre sample of the air with dilute sodium hydroxide solution, when an equimolecular mixture of sodium nitrate and sodium nitrite is obtained, titrating the nitrite with standard potassium permanganate and calculating the original amount of nitrogen peroxide present from the titration result. This method was not sufficiently sensitive for the purpose, however, and was abandoned. The method which depends upon the liberation of iodine from potassium iodide solution by nitrogen peroxide, the liberated iodine being titrated with standard sodium thiosulphate, was found useless for this work, being interfered with by the presence of ozone and giving erratic results for other reasons.

¹ This work was carried out under the control of the Cancer Research Committee of the University of Sydney and with the aid of the Cancer Research and Treatment Fund.

In the method finally found very sensitive and accurate, use is made of a standard procedure for the estimation of nitrates and nitrites; there was no interference with this method by any other substances normally present.

To a four litre sample of the gas in a Winchester bottle there are added ten cubic centimetres of decinormal sodium hydrate and fifty cubic centimetres of doubly distilled water; the bottle is shaken for fifteen minutes. The solution is then poured into 250 cubic centimetres of boiling doubly distilled water in a 400 cubic centimetre flask, five cubic centimetres of a 25% solution of sodium hydrate are added and boiling is continued until the whole is evaporated down to one hundred cubic centimetres, after which it is cooled, a strip of aluminium foil (ten centimetres by six millimetres) is added, the flask is corked with a Bunsen valve and stood overnight. A condenser is then attached, a trap being inserted and the contents distilled into a Nessler tube. The ammonia is estimated by Nesslerization in the ordinary way. Blanks must always be carried out, being subjected to identical treatment throughout and subtracted from the final results. The room from which the samples were taken was completely shut off from the treatment room, but communicated with the operators' room through a doorway provided with a sliding door, always kept shut. The dimensions of the room were 453 by 213 by 367 centimetres high (14 feet 11 inches by seven feet one inch by 12 feet nine inches), the cubic capacity being about 36,790 litres (1,300 cubic feet). The only provision for ventilation consisted in two 22.5 centimetre (nine inch) diameter pipes through the ceiling, surmounted by cowls at the exterior, and the escape of air from the room was therefore slow.

The machine used which generated 300 kilovolts at thirty milliamperes, was provided with four rectifying units coupled in pairs. Each unit consisted of the familiar and efficient rotating toroid system and spherical collectors. At each rectifier, when the machine was in use, there was almost continuous sparking of very high tension current, these sparks resulting in the formation of nitrogen peroxide. The air movements set up by the rapidly rotating toroids were sufficient to distribute the nitrogen peroxide formed uniformly throughout the room and samples of the air, taken at the same time at different points, contained the same amount of impurity.

The treatment room containing the X ray tube was completely screened off by lead two millimetres in thickness so that the nitrifying effect of the X radiations may be neglected.

The nitrogen peroxide found in the atmosphere of the room after different periods of arcing is shown in Table I.

The rate of production of nitrogen peroxide calculated from the first two figures given in the table was found to be as set out in Table II.

TABLE I.
Nitrogen peroxide in atmosphere of room containing mechanical rectifier of X ray therapy plant.

Day.	Time of Observation.	Nitrogen Peroxide in Milligrammes per litre of air.
Monday ..	Twelve minutes after starting machine	0.015
Tuesday ..	Sixteen minutes after starting machine	0.018
Wednesday.	Machine used for 30 minutes between 10.30 a.m. and 12 noon. Samples taken at 12 noon	0.025
Thursday ..	Machine not used in morning. Used for approximately 60 minutes between 2 p.m. and 4.30 p.m. Samples taken at 4.30 p.m.	0.059
Friday ..	Machine in use intermittently during whole day. Approximate total time of using 100 minutes. Sample taken 4.30 p.m.	0.077

TABLE II.

Time Machine in Use (mins.)	Nitrogen Peroxide in Air (milligrammes per litre).	Cubic Capacity of Room (litres).	Total Amount Peroxide Nitrogen Produced (litres).	Litres of Nitrogen Peroxide Produced per Minute.
12	0.015	36,790	0.27	0.0225
16	0.018	36,790	0.32	0.0200
Mean value				0.0213

With this figure it was possible to calculate the actual production of nitrogen peroxide in the room from the period for which the machine was in use on subsequent days, and by comparison with the amount found, to obtain some indication of the extent of the ventilation of the room.

The figures in the last column in Table III show that the room was poorly ventilated, since only 17% to 35% of the peroxide produced escaped, even when the machine was in use intermittently over long periods. The difference in the rate of escape of air from the room on different days is due to the effect of the prevailing winds on the effectiveness of the ventilating cowls.

TABLE III.

Time Machine Actually in Use.	Nitrogen Peroxide Found in Air (milligrammes per litre).	Total Nitrogen Peroxide in Room (litres).	Total Nitrogen Peroxide Produced by Machine (litres).	Nitrogen Peroxide Lost.
30 minutes (during 1 hour 30 minutes) ..	0.025	0.45	0.64	30%
60 minutes (during 2 hours 30 minutes) ..	0.059	1.06	1.28	17%
100 minutes (during 6 hours) ..	0.077	1.38	2.13	35%

Efficient ventilation should be a feature of all rooms in which mechanical rectifying units are housed. In the above case, owing to the lack of other provision for the escape of the air containing nitrogen peroxide, there was a marked tendency for

it to escape round and underneath the dividing door into the operators' room and cause headache in the occupants of this room.

THE SURGICAL IMPORTANCE OF OSTEOMATA OF THE LOWER END OF THE FEMUR.

By ROY HUCKELL, M.D., Ch.B., F.C.S.A.,
Melbourne.

THE various benign outgrowths from bone of a calcareous nature are not uncommon, apart from those of a definite inflammatory nature and therefore a manifestation of chronic osteitis. The term exostosis is in very general use; it is non-committal, but has little else to recommend it. This latter term would embrace the true neoplastic osteomata which have the structure of true bone, either cancellous or compact, and also mere calcifying processes occurring for example in tendon attachments, an example of which occasionally occurs in the region under consideration, in the tendon of the *adductor magnus*.

It is not intended in this short paper to discuss osteoma, considered as a neoplasm. We know no more of its aetiology than we do of the rest of the neoplasms, but this growth has its interesting and thought-provoking features, such as its tendency to multiplicity, its elective affinity for points near the epiphyseal lines, its appearance about puberty and its familial relations. But when we regard the osteoma from a regional standpoint, as indicated by the title of this article, we can only wonder why it does not more often force itself on the attention of the surgeon.

For here we have the main artery and vein of the thigh lying close to the bone for a considerable distance, winding from the inner side through the *adductor magnus* opening to reach the popliteal space, this being the commonest position in the body, moreover, for traumatic aneurysm and arterio-venous aneurysm. The leg also in young people and young adults is subject to much traumatism. Yet Nové-Josserand,⁽¹⁾ after a search through the literature, states that he is able to find only eleven cases reported of traumatic rupture of either artery or vein or both in this position due to the presence of osteomata. He records a case in a little girl who was under observation for about sixteen months following a fall on the knee. At one time even osteo-sarcoma was considered in the diagnosis. At the operation, finally performed, an enormous amount of blood clot of different ages was cleaned out and a longitudinal tear in the artery was discovered, caused by pressure against a sharp part of the "exostosis." Both artery and vein were double ligatured. In other cases reported the treatment involved amputation; in others lateral suture was attempted. His article makes interesting reading. Sarcoma may seem a very wild diagnosis, but a tense mass of blood clot in a muscle may simulate it closely as in a case reported by Cato.⁽²⁾ Of course, a skiagram should clear up the point.

The writer was fortunate in being permitted to operate before such a serious sequel had occurred. The history was as follows:

A muscular man, aged twenty-three years, thought he had knocked his left knee ten years before (of course, this sort of history means nothing). Then he noted a lump "like a bone growing." There was no pain whatever. He stated that it reached its maximum size in two or three weeks (probably mistaken) and remained this size for about eight years. It was tender to a smart hit. Two weeks before seen by the writer it began to become painful and he ascribed this to the friction against the steering column of his car, but the lump did not increase in size. Then in twenty-four hours it increased many times in size and became very painful and the leg became useless. He felt well enough in general health. At this time he came under observation. He had been a healthy man in all ways apart from this trouble and had not any venereal infection. He was married and the wife had one healthy child. His temperature was 36.9° C. (98.4° F.) and his pulse rate 78 in the minute. A hard mass could be felt about five centimetres above the internal condyle and one the antero-internal aspect of the femur and immovable apart from the bone. A large ovoid, slightly tender mass spread from this, mostly upwards. The whole muscle was tense and mass and muscle moved together. The foot was not oedematous and was warm and the posterior tibial pulse was present. The diagnosis was obvious and evidently it was not the main artery that was torn. A skiagram confirmed the diagnosis. At the operation the osteoma was found beneath the *vastus internus* muscle and had apparently torn through the deep branch of the *anastomotica magna* artery. The main artery of the leg was behind it in this position and probably separated by some fibres of the *adductor magnus* tendon.

These osteomata of the long bones are always of the cancellous type. They have a thin sheet of compact bone and, when chiselled off, leave naturally a space on the bone where the cancellous tissue is exposed.

As they are always so near the epiphysis and the joint, they once presented rather a dubious task to the surgeon for fear of sepsis which would be disastrous. But in these days, of course, this consideration has lost its force, except as a reminder of what can happen if a breach develops in the surgical technique. It is wise to insert a drain for forty-eight hours, as there is considerable oozing from the exposed cancellous surface. All blood clot, of course, must be thoroughly cleared out and the application of a back splint for a week is also a rational proceeding.

References.

- ⁽¹⁾ G. Nové-Josserand: "Déchirure de l'artère fémorale par une exostose ostéogénique," *Lyon Chirurgical*, March-April, 1927, Tome XXIV, page 234.
- ⁽²⁾ E. T. Cato: "An Instructive Diagnostic Error," *The Journal of the College of Surgeons of Australasia*, November, 1929, Volume II, page 270.

Reports of Cases.

ADDISON'S DISEASE: ABSENCE OF THE RIGHT SUPRARENAL GLAND WITH ATROPHY OF THE LEFT SUPRARENAL.

By R. J. WRIGHT-SMITH, M.D., B.S. (Melbourne),
From the Walter and Eliza Hall Institute of Research,
Melbourne.

VARIOUS pathological conditions of the suprarenal glands have been found in cases of Addison's disease. Amongst

these lesions fibrocasseous tuberculosis predominates, but suprarenal atrophy is not uncommon. Brenner⁽¹⁾ reports five cases of atrophy and reviews the literature. He gives tables of forty-two cases of Addison's disease with suprarenal atrophy and concludes that the symptoms of Addison's disease are due to lesions of the suprarenal cortex and not to lesions of the medulla or of the chromaffin system as a whole.

Clinical History.

A further case is reported here. A female, aged thirty years, single, was admitted to the Melbourne Hospital on November 9, 1929. As a child she had had measles, mumps and bronchitis and had always been delicate, though able to carry out her duties as a waitress until three years before admission. She then noticed that she became easily fatigued and generally felt "off colour." A year later the fatigue became very pronounced with weakness in the legs and numbness of the hands and feet. For the past twelve months she had been unable to work and had frequently fainted on assuming an upright position. She had noticed increasing pallor of the face and brownish pigmentation of the hands and feet during this time. Her appetite had been very poor and she had lost a considerable amount of weight. Occasionally she complained of colicky pain in the lower part of the abdomen with infrequent vomiting directly after meals. Her bowels were open regularly and bouts of diarrhoea were not uncommon. Menstruation was regular, but the flow had been scanty for years. She was a pale young woman, slightly emaciated. The skin generally was sallow and the hands and feet were pigmented brown. Patches of brownish pigmentation were also present on the legs, abdominal wall and on the mucous membrane of the mouth. The temperature was subnormal and the pulse was regular, but of small volume and low tension. The systolic blood pressure was 80 millimetres of mercury, the diastolic pressure 60 millimetres. The apex beat of the heart was impalpable and the heart sounds were very faint and apparently normal. Respiratory movement was poor and no adventitious sounds were heard. None of the abdominal viscera was palpable.

Examination of the nervous system revealed no abnormality. The urine was alkaline and contained a few fatty casts. No albumin was present. A fractional test meal revealed absence of free hydrochloric acid. An examination of the blood revealed the following:

Red blood corpuscles, per cubic millimetre	3,980,000
White blood corpuscles, per cubic millimetre	10,000
Hæmoglobin value	80%
Colour index	1.05

Lymphocytes numbered 50% of the total white cells, the neutrophil polymorphonuclear cells 37%. There was no increase in the number of reticulocytes and no abnormal forms were seen.

She continually complained of the cold and became mentally very apathetic. The systolic blood pressure at no time arose above 80 millimetres of mercury. Four days after admission her mental condition became very poor with great restlessness and she died very suddenly.

Post Mortem Findings.

Post mortem examination was conducted eight hours after death. There was no post mortem staining and the pigmentation which was a prominent clinical feature, was rather less marked. The right adrenal gland was completely absent and no trace of suprarenal tissue or aberrant suprarenal tissue could be found on the right side. The left adrenal gland was embedded in a mass of fine fibrous tissue at the upper pole of the left kidney and measured fifteen millimetres in length, six millimetres in breadth and one to two millimetres in thickness. The gland showed an extreme degree of hypoplasia and was pigmented a greenish yellow colour. The cortex was well marked, but very narrow and medullary tissue was extremely scanty. No aberrant adrenal was present on the left side.

The heart was very small. The muscle was brownish and soft and the cavities were small. The valves were normal. The aorta was very small, thin walled and almost transparent. There was no atheroma. The lungs

were very small and pink and contained air throughout. There was some superficial hyaline scarring on the superficial aspect of each apex, but no other evidence of tuberculous infection was present. The air passages were normal and the tracheo-bronchial lymphatic glands showed no enlargement or evidence of tuberculous infection. The thyroid gland was small, pale and soft. The alimentary tract revealed no abnormality.

The liver was small, red and soft and was the site of two degenerated hydatid cysts. The gall bladder and bile ducts were normal.

The pancreas and spleen were small and showed a normal structure on section.

Both kidneys were small and rounded and revealed no abnormality. The uterus was small, but otherwise normal. In the right ovary there was a large cyst and in the left a corpus luteum into which recent hæmorrhage had occurred.

Histologically (see Figures I and II) the left adrenal gland is enclosed within a capsule of fairly dense fibrous



FIGURE I.

Low power microphotograph of the left adrenal gland.



FIGURE II.

High power microphotograph of the left adrenal gland.

tissue which contains numerous blood vessels and shows scattered granules of pigment which gives a reaction for iron. Fibrous septa pass into the gland substance and are coarse and irregular. The cortex is narrow and is not arranged in the typical normal zones, the structure tending to be reticular throughout. The cells vary largely in size, but are generally polyhedral with rounded central nuclei and eosinophile granular protoplasm. In many cells the nuclei are absent and the protoplasm shows commencing fragmentation and vacuolation. Fine fibrous strands and capillary blood spaces are present between individual cells. Small collections of lymphocytes occur through the substance. Medullary tissue is almost entirely absent.

The macroscopical and microscopical features presented by the left suprarenal gland in the present case suggest that an inflammatory process is the basis of the condition. Further, the presence of necrotic cortical cells with neighbouring areas which show attempted hyperplasia and the absence of medullary tissue, indicate that this process probably belongs to Brenner's third group.

Reference.

(1) Brenner: *Quarterly Journal of Medicine*, 1928-1929, Volume XXII, page 121.

NON-ROTATION OF THE MID-GUT CAUSING SYMPTOMS IN A CHILD.

By J. SHEDDEN DAVIS, M.D. (Sydney),
Honorary Surgeon, Royal Alexandra Hospital for
Children, Sydney.

In *The British Journal of Surgery* of January, 1928, Mr. G. E. Waugh describes in detail five cases in which he has diagnosed congenital malformation of the intestine and in which the patients have subsequently come to operation. The case about to be described is an instance of this condition and its rarity should justify a note as to the exact condition found. In this instance the diagnosis was not reached prior to operation, though the reading of the paper referred to had quickened a sense of expectation of such a condition.

Clinical History.

F.C. first came under observation at the age of two years, that is, in 1923. His general condition at this time was fairly good, there being nothing to report as to any previous illnesses, but he had sore throats with attacks of croup. These settled down and he was well until 1925, when he developed diphtheria—a mild attack. At about this time he had some abdominal pain with frequency of micturition, but no vomiting. The urine, however, was quite clear. His weight had been stationary for a year. He had a mild attack of scarlet fever without any sequelæ early in 1926 and continued to have slight attacks of abdominal pain. He was thin, but had a good colour and, although any tenderness there was, seemed to be about the urinary tracts, there was still no abnormal constituent in the urine. In May, 1926, his tonsils were removed and later he gained weight, although he remained below his normal. Towards the end of the year he had no urinary symptoms, but there was some epigastric pain, especially after food and he had slight tenderness in this area. The urine was alkaline, but contained no albumin or pus.

In 1927 the same state of affairs continued, that is, slow gain in weight with occasional attacks of pain without any definite signs and very little general upset. The urine continued clear and there was no infestation with oxyuris. In August of this year he had an attack of abdominal pain and epigastric soreness with raised temperature, but no localizing signs. He had no further attacks for six months, but the weight was stationary.

His elder sister was under treatment at this time. She was of a similar build and appearance to this boy, but had a cough with no clinical signs and a radiographic report that there was some increase in the lung markings which was possibly tuberculous. A von Pirquet test performed on the boy gave a "faintly positive" response and it was thought that here might be the explanation of his failure to gain weight, although it did not account for his abdominal pain. He kept fairly well until November, 1928, when he had an attack of abdominal pain lasting fourteen days off and on without vomiting or urinary symptoms, but with tenderness over the "urinary tracts." Later he had frequency again, but the urine contained no abnormal constituents. Early last year he had attacks of vomiting and pain, with frequency and tenderness high up on both sides of the abdomen. In March he was seen by a colleague in my

absence, when the findings were similar, but there was also a faint cloud of albumin in the urine. He improved again, commenced gaining weight and kept well until November, when he had an attack with vomiting and was told he had appendicitis. Seen four days after this there was no appendiceal tenderness, but he had definite tenderness over the right side of the upper part of the abdomen. The urine was clear. He was referred to the surgeon for opinion.

This history is quoted somewhat fully in view of the interesting operative findings, as the abdomen was frequently and carefully examined without any suspicion of the abnormality.

A provisional diagnosis was made of chronic appendicular colic of unusual severity, due as so often in children to faecal concretions.

Operation.

An operation with appendicectomy in view was undertaken on November 21, 1929, the usual grid-iron incision being made over McBurney's point, but careful search failed to reveal any large bowel at all. Feeling that the diagnosis of subhepatic appendix was possibly right, a higher right pararectal incision was made and then the right iliac fossa was seen to be quite empty of large gut. After considerable search, what was taken to be the caecum, was found just below the transverse hepatic fissure. The fact that the small gut was traceable to this point led to this supposition. Palpation had already established the fact that the small intestine was attached as usual by a mesentery, though this did not come down as far nor quite so much over to the right as expected. Some filmy folds (? adhesions) were separated over the supposed colon and then it appeared that the structure in question was really the first part of the duodenum somewhat bound down to the right side of the spine in the region of the foramen of Winslow. The latter was normal and the remainder of the duodenum, instead of looping round the body and head of the pancreas to reach the left side of the spine, became at once free with a mesentery which continued by gradual transition into the jejunal mesentery. Further search revealed the ascending colon on the left side of the abdomen and attached by a long mesentery (the attachment of which was not observed, save that it must have been to the left of the spine); this permitted its being drawn over easily into the incision, when a free and unimpeachable appendix was removed. Though the condition was then recognized at its true value, nothing had been found to indicate the exact cause of the obstructive symptoms that had continued intermittently over so large a portion of the child's life, so that nothing further was attempted before the abdomen was closed.

After History.

All went smoothly till December 4, 1929, when the child vomited twice and an enema produced a constipated result. This vomiting continued till December 7, 1929 (a period of three days), a little distension only becoming evident at the end of this time and then in the lower half of the abdomen, the pain which had appeared early in the attack, being mostly on the right below the costal margin, as in his usual attacks. No rigidity developed at all and only towards the end did the vomitus show any suggestion of complete obstruction. During this time the diagnosis was complicated by the supposition that he was passing through one of his usual attacks which might be expected to clear without resort to surgical interference. Another possibility, discussed not very favourably, was the possibility of his attacks being of the nature of cyclic vomiting and this being one of such. However, at a second operation it was found that the upper part of the small gut had looped itself into a somewhat volvulus-like mass and that this had rotated clockwise into a figure of eight which was adherent in many places. Many of these adhesions were freed and oversewn in part, the rotation undone and the gut replaced. Fortunately the shock likely from the prolonged manipulation required for this was greatly minimized by the administration of ethylene gas

as an anæsthetic by Dr. Steigrad. Much of the small gut was greatly distended with foul fluid which was evacuated by incision as thoroughly as possible. All went well subsequently with the exception of the abdominal wound, which broke down in its superficial layers, having been obviously infected with bowel contents.

At the time of writing this, March 14, 1930 (ninety-seven days after the second operation), the child is about and well, having had so far no further attacks of abdominal pain.

X ray examination after a barium meal showed the colon to be on the left side of the abdomen.

Discussion.

In the discussion of symptomatology Mr. Waugh calls attention to the unusual nature of the history of pain, a factor which in this case ought to have received more attention than it did. Vomiting, he points out, is usually more reflex than truly obstructive, but in this case this does not appear to have obtained. The sense of emptiness in the right iliac fossa which he stresses, was not noted in this patient and, as far as one can judge "after the event," my impression is that no one would have detected it without suggestion. Neither was asymmetrical fullness present.

A reference to Norman Dott's paper on anomalies of rotation of the intestine in *The British Journal of Surgery* of October, 1923, will show that the underlying pathology of the condition is that the mid-gut, that is, the portion extending from the biliary papilla to the middle of the transverse colon (or the section of the gut supplied by the superior mesenteric artery), after herniating as normally into the umbilical sac in the process of development, has been reduced into the abdomen without the necessary preliminary rotation anticlockwise which normally throws the transverse colon across the root of the mesentery and the upper abdominal contents. So that in such a patient as this all the small gut remains on the right side and all the large folds itself on the left. In detail the first stage of rotation has occurred, that is, a turn 90° anticlockwise, but the second stage has entirely failed. Just what was the cause of the obstructive symptoms in this patient has not appeared, for my impression is that the obstruction relieved at the second operation was secondary in its character. There is, of course, added to this a definite abnormality of adhesion of the mesentery of the various parts of the gut, as evidenced by the long mesentery which attached the caecum and ascending colon to the posterior abdominal wall. The case rather conforms in type to Dott's Case II, though it would appear that the presence of a more or less well developed mesenteric attachment for the small intestine had prevented the development of such a volvulus as occurred in his patient in the first few days of life.

OBSTRUCTION OF SMALL INTESTINE.

By J. COLVIN STOREY, M.B., Ch.M. (Sydney), F.R.C.S. (England), F.C.S.A.,

Honorary Surgeon, Royal Prince Alfred Hospital;
Honorary Surgeon, Coast Hospital,
Sydney.

Case I.

L.B., A FEMALE, ætatis nine, was admitted to Royal Prince Alfred Hospital on February 28, 1930, and was seen during "rounds" on the afternoon of the day of admission. The history was that she had been operated on by her own doctor last Christmas for an acute attack of appendicitis. The appendix had been found retrocaecal and acutely inflamed. At operation a cyst had been observed in the mesentery of the terminal portion of the ileum and a piece of this had been excised for microscopical examination, but had been lost. The child had been well till two weeks ago, when she had commenced vomiting. During the

last week there had been no proper action of the bowels, but enemata had been given with faecal results.

On examination the little girl was found to be very thin and emaciated, with appearance suggestive of a recent illness. She had not vomited since morning and there was little distension. On the morning of March 1, 1930, the house surgeon rang and informed me that the patient had vomited a large quantity of offensive brown fluid during the night, but had not vomited during the day and was then comfortable. I at once went to see the patient and found her in much the same general condition as on the previous day, but the vomitus was very stercoraceous and there was some splashing in the left side of her abdomen. Operation was clearly indicated. A preliminary lavage of the stomach was considered to be wise practice and this evacuated great quantities of foul brown fluid.

Under ether anæsthesia given by the open method an incision was made just to the right of the middle line, extending above and below the umbilicus. Distended loops of small intestine were encountered. A purse string suture of fine silk was cast in the expanded gut and a trocar and cannula attached to the suction apparatus, was inserted through the centre of purse string; some fluid was evacuated by this method and the bowel collapsed. There was not, however, much fluid present in this case, most had apparently been vomited, and the part of the bowel with puncture hole was invaginated, the purse string was drawn taut and tied. It was then found that a mesenteric lymph cyst had adhered to the parietal peritoneum in the region of the previous operation scar and round this fixed loop as a "bight" practically all the small intestine had formed a volvulus. The terminal few inches of the ileum were in a collapsed state. The cyst was separated from the abdominal wall, with escape of a little chyle and the bowel was undone from its torsion. The cyst was about the size of a billiard ball and was in the mesentery of the terminal ileum, hard up against the bowel. Higher up in immediate proximity were two smaller cysts.

Five hundred cubic centimetres of 10% glucose in normal gum saline solution were given by the intravenous method, followed by twenty units of "Insulin," given intramuscularly. Fifty cubic centimetres of gas gangrene antiserum were then given by intramuscular injection. The operation took sixty minutes. Two or three hours after operation the patient's condition was much better than it had been prior to the surgical procedure.

On the day after operation the girl vomited some clear fluid and a further twenty-five cubic centimetres of serum were administered. The patient rapidly improved without complication, except for some inflammation of the abdominal wound and the formation of an abscess in the old appendicectomy wound, the latter being incised on March 14, 1930. Her temperature has remained raised a little till the last few days and now it seems to have settled right down (April 6, 1930). A considerable amount of dental caries is present and on admission there was definite stomatitis with ulceration. The general condition is now excellent and beyond the fear of teeth extraction, the little patient has no complaints. Both wounds of the parietes are soundly healed.

Case II.

A.G., a female, ætatis seventy-six, was seen in consultation with Dr. G. M. Clough, of Greenwich, about 8 p.m. on March 2, 1930. She had been operated on by me in 1922 for acute obstruction of the large intestine. A "blind" lumbar colostomy had been performed on the right side and a few weeks later a ring carcinoma of the splenic flexure had been excised and an end-to-end anastomosis performed. The patient had enjoyed good health, but had to take aperients. In 1929 the complaint of abdominal pain had prompted me to make an exploratory laparotomy and peritoneal adhesions had been divided. No recurrence of cancer had been evident. For the past two months the patient had had occasional attacks of emesis and during the last week the vomiting had become persistent. For the past week no movement of the bowel had taken place, but enemata had given some results. No food had been ingested for the past twenty-four hours, the patient being afraid to eat, for she knew that she would at once vomit.

Examination revealed visible peristalsis with a very distended loop of intestine in the left iliac fossa. The patient was at once taken to Royal Prince Alfred Hospital where an enema was returned clear.

On March 2, 1930, at 11.30 p.m., under ether anaesthesia given by the open method, a mid-line incision was made below the umbilicus. Distended coils of gut were at once seen and were tapped in several places by the method described in Casel. Collapsed small intestine was found and traced to the left flank, where a loop disappeared under adhesions. An entering loop of distended gut was found alongside the collapsed loop. A side-to-side anastomosis was made between the collapsed and distended portions as near the adhesion as was possible without causing any strain whatever upon the junction. A three-tier join was made, fine silk being used for peritoneum, fine chromicized catgut for the muscle layer and plain catgut for the mucosa.

During the time that I was engaged with the operation which took seventy-five minutes, five hundred cubic centimetres of 10% glucose in normal gum saline solution were given intravenously, followed by intramuscular injection of fifteen units of "Insulin." Fifty cubic centimetres of gas gangrene antiserum were then given by the intramuscular route. Immediately after operation the condition was surprisingly good. Uninterrupted recovery took place, with first intention healing of the wound. The patient left hospital quite well on March 25, 1930.

Case III.

A.D., a female, *atatis* fifty-five, was first seen at the Coast Hospital on March 13, 1930. She had been operated on three years previously in another hospital when a partial gastrectomy had been performed. The exact nature of the condition which required this procedure, could not be ascertained. Admission to the Coast Hospital had taken place on March 7, 1930, and the history given was that there had been periodic attacks of vomiting accompanied by swelling of the stomach. Peristalsis had been visible on admission. On the day of my examination vomiting had become persistent and the patient had been very emaciated, with distended coils of intestine and "piping" sounds of borborygmi had been heard on auscultation with splashing.

A preliminary gastric lavage was done. Under ether given by the open method an incision was made just to the right of the mid-line. Distended coils were treated as in Cases I and II. Collapsed gut was found and traced up behind the transverse colon, where a very hard ring mass could be felt. Another such mass could be felt high up in the left and apparently involved the stomach. A side-to-side anastomosis was done in three layers, the distended loop being again "tapped" before the mucous membrane was incised, but after division of peritoneum and muscle along the line of projected union. The junction was left without any tension.

Five hundred cubic centimetres of 10% glucose solution were given intravenously and sixteen units of "Insulin" intramuscularly and also fifty cubic centimetres of gas gangrene antiserum by the latter route. Considering the state of the patient, the post-operative condition was good. On March 20, 1930, vomiting was present and another glucose injection was given. On March 21, 1930, there was no further vomiting. On March 30, 1930, vomiting was occasional and the mental condition had become deranged. Sugar and acetone were present in the urine. Death occurred on March 31, 1930. No *post mortem* examination was allowed.

Case IV.

A.Y., a female, *atatis* sixty-nine, was seen in consultation with Dr. Smidlin, of South Randwick, about 8 p.m. on Saturday, March 15, 1930. Dr. Smidlin had been summoned because the patient had at 3 p.m. on the previous Wednesday, while in her garden, suffered a sudden and unbearable attack of pain in the outer side of the upper portion of her left thigh. He informed me that this had been her only complaint. The pain had been relieved by morphine. The next day (Thursday) vomiting had set in and Dr. Smidlin had done his utmost on several occasions to persuade the patient that hospital treatment was necessary. Not until Saturday did they consent to take action.

On examination the patient was found to be a thin old lady who looked very ill and who had been vomiting very stercoraceous fluid. There was a little distension confined to the left iliac fossa and tenderness was present on palpation of this area. Splashing and "piping" borborygmi were noticed on auscultation. No tenderness of the left thigh was elicited. A right femoral hernia was observed, with an apparently empty sac. The patient was aware of the presence of this hernia, having had it for many years, and it had always been easily reducible. Frequency of micturition had been present for a considerable time. The patient was sent at once to Royal Prince Alfred Hospital.

On March 15, 1930, under ether anaesthesia induced by the open method an incision was made to the left of the mid-line below the umbilicus. Distended coils of small intestine were found and "tapped" as in the previous cases. Collapsed gut was then followed to the left obturator foramen, where it disappeared. The distended entrant part of the loop was lying against it.

At my request Dr. MacMahon flexed the thigh and applied pressure in the adductor region of the left lower limb and I very gently pulled upon the collapsed part of the bowel. The gut suddenly came out of the foramen. There were a couple of dark patches, but the shewn was very evident and the involved bowel viable. The foramen was oversewn with peritoneum. During the operation the intravenous injection of five hundred cubic centimetres of 10% glucose solution was given and also fifteen units of "Insulin" by the intramuscular route and by the latter method fifty cubic centimetres of gas gangrene antiserum were given. On return to the ward the patient's condition was much better than before operation and in fact wonderfully good. Inflammation took place in the wound and for a few days the patient was bothered by her frequency of micturition, but she is now very well.

Case V.

S.R., a female, *atatis* fifty-five, was admitted to Royal Prince Alfred Hospital on the evening of March 16, 1930. Abdominal section had been performed twenty years previously. She had had four operations during the last six years, including an attempt at radical cure of ventral hernia by myself under block anaesthesia some eighteen months before. Six hours before admission an attack of severe pain occurred in her ventral hernia, followed by persistent vomiting. Vomitus had not been offensive. Her doctor had "reduced" the hernia.

On examination the sac was quite lax, but pain was persistent and a loop of bowel could be periodically observed to stand out and then relax. The patient suffers from chronic bronchitis and rhonchi were observed by auscultation.

Under ethylene anaesthesia on March 16, 1930, at 10 p.m. a vertical incision was carefully made over the distended skin covering the hernial sac. Greatly distended bowel was found and "tapped," large quantities of intestinal fluid being so evacuated. The bowel was found to be "nipped" in a secondary sac and was freed. Many adhesions were freed. The abdomen was closed without any attempt being made to treat the hernia. The time of operation was twenty minutes. Except for a little sloughing of skin in immediate line of junction, recovery has been uneventful and the patient is now quite well.

Comment.

This small series seemed worthy of report. It is rather remarkable that the same surgeon should encounter five cases of small bowel obstruction within a fortnight and a day.

As I have been fortunate enough, especially in hospital practice, to see many cases of intestinal obstruction, probably not so many as I think, but still a goodly number, colleagues may appreciate a few observations upon their diagnosis and treatment.

Early recognition of the existence of obstruction is most important, and, as Paul, of Liverpool, says, in Binnie's Treatise, Volume II: "If vomiting be persistent, let there be no delay in operating."

When small intestine becomes caught in a hernia or in a band inside the abdomen, there is onset of pain,

usually soon followed by reflex vomiting. In hernia, contrary to the teaching of some text books, the rupture is nearly always old standing and often enough the patient has had a similar previous experience with his hernia and has been able to "get it back." The hope that he will again succeed may lead to delay in sending for his doctor. The reflex vomiting may, though usual, be replaced by a feeling of nausea. The time of onset of obstructive vomiting depends upon the site of the lesion. The higher the obstruction, the sooner and more persistent the vomiting. In the large bowel emesis may be delayed for many days, even in the presence of absolute obstruction. Visible peristalsis is not usual in acute small bowel obstruction. The presence of "splashing" on shaking the patient is a sign of small bowel distension. High pitched notes of "piping" borborygmi are nearly always present on auscultation. If one flicks the abdominal wall with the finger while listening with the stethoscope, it is sometimes possible to map out the distended coils. A smell of stale fish in the vomitus is almost pathognomonic of small gut obstruction. Distension is often quite absent when the lesion is high and, of course, the lower the block, the greater the distension. In large bowel obstruction the flanks are first distended and in small bowel obstruction the distension tends to be in the centre of the abdomen.

When the caecum is distended, it is nearly always possible to map it out by the combined flicking and auscultation method, extending from the right loin round into the right iliac fossa. A good result from an enema is often misleading and the injection of morphine, however much it be indicated to relieve pain, may so mask the clinical picture that operation is dangerously delayed. With regard to question of operation or palliation, I have been very sorry for waiting and have not regretted immediate action. When one can be reasonably sure that the obstruction is in the large intestine, there is no doubt at all in my mind that a "blind" right lumbar colostomy is easily the safest immediate policy. This can be done quite well under local anaesthesia. If small bowel be obviously involved, a laparotomy is indicated. Unless one feels that vomiting is in abeyance, the stomach should always be washed out prior to operation. What I call "the hedging incision" seems to me most useful in absence of other definite indication. It is just to the right of the mid-line with the umbilicus as centre; it can be prolonged up or down as circumstances warrant. When the gut is distended, always empty it by the method described in the above reports, if necessary by "tapping" at many sites. When properly done, it is without danger and seems safer than "milking" distended gut. Distended bowel should be handled as little as possible. Go at once for collapsed bowel and follow it to the point of anchorage. Of course, in the presence of hernia the incision is made in the region concerned. Case V illustrates that reduction by taxis, though occasionally justifiable, is never certain.

Cases I-IV have dramatically impressed on my mind the great value of the intravenous injection of glucose, with "Insulin" to provide for its use by the famished tissues. The condition of all patients immediately after the operation was splendid to an incredible degree.

This was first brought to my notice by an article in *Surgery, Gynecology and Obstetrics*, published some years ago by an American surgeon named Fisher.

Gas gangrene antiserum has been used by me on several occasions for similar cases and in peritonitis, since Dr. Tebbutt drew attention to the work on this subject, published in *The Lancet* a couple of years ago. I feel that it often helps.

In Case V intravenous treatment was avoided because the condition was in an early stage and the patient was subject to chronic bronchitis.

Case III was the only fatal one of the series. It is a pity that no *post mortem* examination was made, but probably the masses felt were recurrent malignant growths, secondary to carcinoma of the stomach for which, I assume, the original operation had been done.

Case IV was particularly interesting. As soon as I saw the patient I remarked to her doctor that if the pain had only been on the inner side of the thigh, I would

diagnose an obturator hernia, having seen one other such case. The day after operation enthusiastic residents informed me that they had looked up origin of nerves and found that the lateral cutaneous nerve of the thigh came from the dorsal half of the second and third lumbar nerves whilst the obturator came from the anterior half of the second, third and fourth. So that the probable explanation of the site of the pain is that it was a reflex through the cord. With regard to the reflex vomiting in this case, until Friday, April 14, I was under the impression that no vomiting at all had occurred till the day following onset, but the patient then informed me that she had vomited an hour after the pain had been felt.

Acknowledgement.

My gratitude is due to the resident staff of the Royal Prince Alfred and the Coast Hospitals. Every one was most enthusiastic and willing. The great value of "team work" was exemplified in these cases.

The ethylene anaesthesia given to Patient V by Dr. Loewenthal was most successful and in the presence of the stretched abdominal wall ample laxity was obtained. In muscular individuals this method is sometimes not suitable; the rigidity bothers the surgeon. In all the cases the help given was all that could be desired and I am quite sure that it contributed largely to the happy issue.

Reviews.

GROWTH AND NUTRITION.

DR. RAYMOND FRANZEN'S monograph on physical measures of growth and nutrition is a progress report of a school health study of the American Child Health Association.¹

General estimates of nutritional status and detailed reports, even by skilled paediatric physicians, on the various items, forty-six in number, affecting growth and nutrition, are shown to be quite inaccurate. The construction of objective devices for measuring the quantity of each of the qualities of assessed importance involved is essential before we are able to calculate the degree of proper growth, adequate strength and good nutrition of children.

Twelve anthropometric characteristics were selected for use as indices of growth and nutrition, namely, weight, height, shoulder width, breadth of chest, depth of chest, width of hips, size of deltoid muscle, girth of upper arm, girth of calf and amount of subcutaneous tissue over, respectively, the biceps, triceps and calf muscles. It was evident that measurement of growth and nutritional status involves the consideration of weight, amount of muscle and amount of subcutaneous tissue, each taken in relation to normal expectancy of these qualities for given skeletal conformation.

The failure to make proper allowance for skeletal development is the cause of the inaccuracy of qualitative assessments. In the quantitative method, described in detail, great accuracy is obtained which may be made absolute by a system of measurement of "residuals," for example, residual weight is the weight in each case minus the weight to be expected from the skeletal dimensions as actually measured. The correlation of height with weight is only between 0.72 and 0.75. When the score of a child is his deviation in weight from the average weight of his peers in age, height, chest breadth, chest depth, hip breadth and bisacromial width, then such a deviation represents the result of causes of weight over and above an optimum selection of skeletal dimensions. The correlations of these bony measurements with weight are between 0.92 and 0.95 in the six large age-sex groups used in these studies. Consideration of residuals reduces the margin of error to the minimum error which could be due to diurnal fluctuation in weight, the correlations with weight being 0.97 or 0.98 in each of the groups.

¹ "Physical Measures of Growth and Nutrition," by Raymond Franzen, Ph.D.; 1929. New York: American Child Health Association. Royal 8vo, pp. 138. Price: \$1.00 net.

The Medical Journal of Australia

SATURDAY, MAY 3, 1930.

The Mental Hygiene Movement.

PREVENTIVE medicine may be regarded as the effort to secure the ideal described by the adage: *mens sana in corpore sano*. Mental hygiene aims at the production of the *mens sana*. It is thus best regarded as a specialized branch of preventive medicine. It has been defined as that branch of knowledge which deals with the factors that modify the resistance of the individual to the stresses of life. Its first concern is with the individual. Devotion to the principles of mental hygiene will secure for the babe, the infant and the child surroundings which will make it possible for mental development to take place along the right channels. So wide is the scope of mental hygiene that it can embrace every child of every race and every clime. Most of the schemes concerned with the amelioration of the lot of the individual make provision for him up to the age of adolescence, an age exposed to many mental and moral hazards, and then leave him to his own resources. Mental hygiene would take him further; it would direct his footsteps along a suitable industrial course or would give him the benefit of vocational training to enable him to pursue an industrial or other suitable calling. Mental hygiene would give him a healthy attitude of mind so that his leisure hours could be spent to the best possible advantage and when he is too old to work he will be able to look back with the contentment arising from brave endeavour. Mental hygiene is not occupied solely with so-called normal persons. It finds an extensive sphere of usefulness in the care of the mentally deficient, the criminal and the insane. By its doctrines the deficient are guarded and trained in useful tasks so that they will not be an undue burden on their relatives or on the community; the criminal are treated accord-

ing to their mentality and responsibility, the punishment being made to fit the criminal and not the crime; the insane are placed in surroundings most conducive to recovery, they are provided with voluntary clinics attached to general hospitals and during the process of recovery from their mental illness they are assisted in the process of readjustment. Further than this, mental hygiene is concerned with research into the special causes of deficiency and maladjustment and with the education of the public so that they may be directed to a proper understanding of mental deficiency and disease. Mental hygiene is thus seen to be concerned not only with the individual but with the community, with the establishment of harmony between the individual and the community and the organization of the community to help the individual.

Mental hygiene has already gained wide acceptance. That there is in Australia a band of earnest workers on its behalf is seen from the papers presented at the third session of the Australasian Medical Congress (British Medical Association) by Dr. R. A. Noble, Dr. John Bostock and Dr. H. F. Maudsley and by the discussion which took place. In New South Wales steps have been taken at the instance of the Section of Neurology and Psychiatry of the New South Wales Branch of the British Medical Association for the formation of a Council for Mental Hygiene. The cooperation of various official and philanthropic bodies has been sought and obtained. More recently a move has been made towards the formation of a similar council in Victoria. By this step Australia becomes linked up with a world-wide movement. The extent of the movement is shown by the fact that at the first International Congress on Mental Hygiene, to be held at Washington on May 5 to 10, 1930, thirty countries will be represented. Dr. R. A. Noble, of Sydney, has been appointed by the Commonwealth Government as official representative for Australia. The papers to be presented cover the whole range of subjects connected with mental hygiene and special arrangements have been made to permit free discussion. It is hoped that it will be possible to publish an account of the deliberations in this journal.

Attention has been drawn to the aims of mental hygiene and to the progress already made. The future of the question in Australia depends on individual practitioners. The latter realize the importance of preventive medicine; they should not be slow to follow the aims of one branch of that large subject. Every medical practitioner practises mental hygiene to some extent. Further study will enlarge his outlook, will bring him results in the contentment and mental well-being of his patients and will enable him to deal more effectively with the mentally deficient and the mentally afflicted. Moreover, in the larger sphere it will give him opportunities for cooperation with psychologists, welfare workers and other philanthropists. With the interest of the individual will come the extension to other States of councils similar to those already formed in New South Wales and Victoria.

Current Comment.

THE CARBOHYDRATE CONTENT OF FOODS.

YEAR by year the attention of the clinician is drawn more and more to the problems of nutrition. The feeding of children, the treatment of rickets, scurvy and beri beri, the dieting of diabetics and even the importunity of the drawing room guest who demands a practitioner's opinion of this food or that, compel a meticulous study of the food elements. In diabetes especially adequate treatment necessitates knowledge of both the qualitative and the quantitative constituents of foods.

Recently R. A. McCance and R. D. Lawrence, two workers in the Biochemical Department of King's College Hospital, London, have published¹ the results of an extensive analysis of the starches of plant foods and an investigation of the food value of vegetable carbohydrates. Their monograph makes pleasant reading. It is distinguished by clarity and is not without a claim to good style.

It must be apparent to the physician that clinical dietetics is an inaccurate science. There is a deplorable lack of standardization of food values. While figures for protein and fat are consistent enough, those for the starch values of foods recorded in text books of biochemistry and medicine show an extraordinary oscillation, the variation in many instances being several hundred *per centum*. Moreover, very few analyses of cooked foods are available. As the starch content of many plants is altered considerably by boiling, baking or frying and as man

delights in the handiwork of the cook, the shortcomings of the food tables in general use are apparent. Further, the clinician is, or should be, concerned only with starch available for absorption, conversion into sugar and metabolism. The unavailable carbohydrate is more or less useless as fuel for the body machine. Yet seldom is any distinction made between these two classes of starch. The authors set out, therefore, on a venture of high importance—to determine the available carbohydrate of foods in the form in which men eat them, whether in the natural state or in the guise of ordinary domestic cooking. Between eighty and one hundred fruits, nuts and vegetables were subjected to a sixfold analysis. The figures are illuminating. For example, whereas the total reducing sugars in cabbage averaged 2.4, the available carbohydrate was only 1.1 in each hundred parts by weight. Lettuce, usually classed for diabetic diets as a "2% to 5% vegetable," has but 0.7% of its weight available for metabolism. Bananas, on the other hand, which have a mean total of 19.6% in the form of reducing sugars have 18.7% capable of utilization, while the corresponding figures for old potatoes in cooked form are 19.9% and 19.2% respectively.

McCance and Lawrence are apparently sensitive of the necessity for distinguishing clearly between the two classes of substances usually spoken of as carbohydrates. Much of the present confusion is due to imperfect knowledge of the parts they play in the alimentary canal of man. Starch and the soluble sugars which include sucrose, glucose and fructose, are the nutritional carbohydrates of animals, for they are capable of almost complete digestion, absorption as sugar, storage in the liver and muscles and final oxidation if the pancreas is intact. They are all capable of removal from a plant by means of warm water and the enzyme diastase. The other so-called carbohydrates are the hemicelluloses and fibre. The hemicelluloses include a large number of substances, all of which require dilute mineral acids to hydrolyse them into their constituent members. Unlike starch, they resist digestion by the enzymes present in the bowel of man. Fibre, known usually by the loose term "cellulose," represents the most resistant parts of the plant skeleton. It is the insoluble residue which survives treatment of the plant with water, dilute acids and alkalis, alcohol and ether. While cellulose and the pentosans (hemicelluloses) are, like starch, polysaccharides, they, unlike starch, are immune to attack by enzymes. Symbiosis is the mechanism by which they are decomposed in the gut. Micro-organisms act upon them. This bacterial decomposition is incomplete, the final products being butyric, acetic and lactic acids and gases which include carbon dioxide, hydrogen and methane. Excessive gas production is a characteristic feature of diets containing cellulose. Rubner, who gave a cellulose dietary to dogs, states that the animals suffered from flatulence to such a degree that their sleep was disturbed. The organic acids are absorbed

¹"The Carbohydrate Content of Foods," by R. A. McCance and R. D. Lawrence, Medical Research Council, Special Report Series, Number 135.

unaltered. They are not sugars and are therefore incapable of supplying the tissues with carbohydrate. These non-sugar-producing polysaccharides form nine-tenths by weight of the carbohydrate of some of our common plant foods and yet supply our bodies with but a small fraction of our total metabolic requirements.

How, then, do these polysaccharides act? It has long been known that their great bulk acts as a stimulus for peristalsis of the large gut. McCance and Lawrence have confirmed this view. But they point out that the well-known laxative action of fibre and the pentosans is a more complicated process. A very important factor is the local stimulation of the intestine by the products of their decomposition. Some chemical extract, as yet unknown, stimulates the glands of the gut, leading to increased secretion of mucus. The addition of mucus to the faeces increases the bulk and moistens and lubricates the residue. More rapid transit along the bowel is thereby promoted and aided. Some polysaccharides increase the faecal residue by passing unchanged through the alimentary tract and others again owe their laxative action to their property of holding water. Agar-agar is an allied substance which acts in this latter manner. Still other polysaccharides induce local peristalsis by virtue of their rough physical form.

The temptation to discuss the vexed question of the relative merits of white and whole-meal bread was not resisted by these investigators. The lay press in writing and the diet crank in conversation have for years waged enthusiastic warfare against the use of refined flour. Liebig was the foster father of whole-meal bread. In the year 1868, when a famine was ravaging East Prussia, he advocated its use on the grounds that it contained more protein and satisfied hunger more easily than its white competitor, that it was easily digested, and that the outer layers of the grain contained phosphorus and other inorganic salts which acted as "tonics to the system." The whole-meal craze had largely subsided when the discovery of vitamins and especially vitamin B gave fresh impetus to the agitation. That vitamin B is present in eggs, vegetables, seeds and to a less extent in meat, did not appease the fanatics. It was impossible to have too much of a good thing. Whole-meal reform leagues sprang up, popular lectures were given and books and articles were written. But the people, in spite of this campaign, go on eating white bread. McCance and Lawrence point out the absurdity of compelling anyone who dislikes a food of unproved value to eat it willy-nilly. Children are intolerant of high cellulose diets and actually lose a higher percentage of food calories in the faeces on a whole-meal than on a white bread diet. The crusts of whole-meal bread are tougher and harder than those of white and they are therefore largely discarded. The fact is that the present crusade is based on fads and fancies. Unbiased reasoning and careful experiment have not justified the claims made.

ACUTE TONSILLITIS.

A RECENT investigation of acute tonsillitis by H. G. Close has enabled him to come to conclusions which call for consideration.¹ Tonsillitis occurs so frequently that the treatment of patients is apt to become stereotyped. Further than this, some medical practitioners are prone to regard it as a condition of not very great importance. Close's investigation concerned the patients treated at the casualty department of Guy's Hospital during the seven-year period 1921 to 1927 inclusive. During this period the number of patients attending the casualty department for the first time was 386,272 and of these 25,629 suffered from acute tonsillitis, an incidence of 6.7% or one in fifteen. There are two facts which detract from the value of Close's observations, one, that all patients over ten years of age were registered as adults, the other, that his conclusions in regard to bacteriological findings and the results of tonsillectomy are taken from the work of others and not from his own series which would be expected to yield important criteria.

Of the 25,629 patients 13,708 were under ten years of age and 11,921 were "adults" or over ten years of age. In view of this differentiation it is doubtful whether much attention should be paid to Close's suggestion that acute tonsillitis occurs more frequently among adults than is usually supposed. The incidence of tonsillitis in "adults" varied inversely with the rainfall. In children the incidence of tonsillitis was lowest in 1921, a dry year, and highest in 1925, a normal wet year. Among the total number of patients with tonsillitis there were 519 who suffered from quinsy—one in fifty. Only five attacks of quinsy were diagnosed in those under ten years of age. This agrees with the generally accepted view of the incidence of quinsy. In regard to bacteriological findings, Close accepts the findings of other workers that the hæmolytic streptococcus is the predominating organism, particularly that of the β -hæmolytic type. Close points out that scarlet fever is usually associated with tonsillar infection, both in adults and children. He also states that the changes in the composition of the blood are the same in the two diseases (particularly in the alkali reserve) and he adds that it is rational to advocate more prolonged confinement to bed in tonsillitis on this account as a prophylactic measure against complications and sequelæ. This is quite reasonable.

The last point to be considered is that of tonsillectomy. Close suggests that tonsillectomy is performed more often than the evidence as to its efficacy would justify. This view will not be popular, but it should be considered. Close quotes Osman as having been able to relieve debility in children, not by tonsillectomy, but by increasing the amount of sugar in the diet, and Miller as having obtained results by putting children in hygienic surroundings. Many occasions will arise when these methods should be preferred.

¹ *Guy's Hospital Reports*, January, 1930.

Abstracts from Current Medical Literature.

BACTERIOLOGY AND IMMUNOLOGY.

Tuberculosis in the Guinea-Pig.

A. STANLEY GRIFFITH (*Journal of Pathology and Bacteriology*, January, 1930) states that spontaneous tuberculosis in guinea-pigs has occurred but rarely in his laboratory animals. He attributes this relative freedom to precautions taken to prevent dissemination of infective material in the form of dust. Spontaneous tuberculosis in guinea-pigs in houses used for experiment is generally of respiratory origin, the most advanced lesions being in the thoracic organs. Of seven strains of tubercle bacilli isolated from spontaneous disease in guinea-pigs examined by the author during 1912 to 1927, six were bovine and one was human. In 1928 two further infections were encountered and the strains of tubercle bacilli recovered proved to be of the avian type. The details of these two cases are as follows. In January, 1928, three guinea-pigs were inoculated subcutaneously with emulsion of a lupus nodule. Culture tubes inoculated directly with some of the emulsion treated with 2.5% potassium hydrate remained sterile. The pigs were kept in a separate cage in a room reserved for guinea-pigs inoculated with original tuberculous tissue. One of the three guinea-pigs was killed sixty-six days after inoculation and was found to be free from infection. The other pigs were allowed to live for one hundred and seventy-four days, when they were killed. Neither had shown any sign of infection at the site of inoculation and at the autopsies the inguinal glands and all the abdominal organs and glands were normal. Tuberculous lesions were, however, found in the right bronchial gland of each of the two animals. The appearances of the lesions and the fact that tubercle bacilli were abundant in the pus suggested that the infecting organism belonged to the avian type of tubercle bacilli and bacteriological examination confirmed this. The only obvious source of the avian bacilli was a pigeon living with some fowls in an adjoining room. The door between the two rooms was kept closed, but there was a space of 2.5 centimetres (an inch) between the bottom of the door and the floor. The cage in which the guinea-pigs were kept rested on the floor against the door and was directly exposed to air currents which passed under the door from the room in which the infected bird was kept. The pigeon had been inoculated intravenously with avian tubercle bacilli and was found at autopsy to be suffering from severe tuberculous enteritis; tubercle bacilli were abundantly present in the fecal contents of the colon. There seems little doubt that the guinea-pigs became infected by inhaling the dried and pulverized feces of this pigeon.

In September, 1929, another spontaneous infection was discovered. The guinea-pig was inoculated subcutaneously in February, 1926, with an avian culture of tubercle bacilli and was kept in a separate cage for a period of three years two hundred and twenty days, when it was killed. At autopsy no local lesion was found, but one inguinal gland at the site of inoculation contained a pin-head sized purulent focus. The lungs contained one pea-sized caseous nodule and scattered miliary tubercles. There were also lesions in the tracheo-bronchial glands, the portal gland and the spleen. Media inoculated from the inguinal gland remained sterile, but from the portal gland and the spleen human tubercle bacilli were grown.

Undulant Fever.

CHARLES M. CARPENTER AND RUTH A. BOAK (*Journal of Laboratory and Clinical Medicine*, February, 1930) detail the results of their experience in the laboratory diagnosis of undulant fever. They suggest that many cases of the disease have been diagnosed as other infections in the past and that the tendency at present is to base a diagnosis of undulant fever upon too little evidence. As aids to diagnosis they suggest the use of the agglutination test and of the complement fixation test, blood culture, the use of an agglutination absorption test, a blood count. The agglutination test is the simplest and most satisfactory, but it has its limitations. Of the patients studied 6% had no agglutinins in the blood. When agglutinins are present they usually remain for a long time. The serum of three patients has been tested every month for two years and each specimen still shows a comparatively high titre. Quite frequently a prezone in the agglutination test is present. Incubation of the tubes should be carried out for eight hours and titres obtained vary from one in fifteen to one in four hundred. The serum should also be set up with an emulsion of *Brucella melitensis*. For blood cultures twenty cubic centimetres of blood are collected and a meat infusion agar (preferably liver) with a pH value of 6.8 to 7.0 can be used. Some of the inoculated media is incubated in a jar in which 15% of the air has been replaced by 10% carbon dioxide; the remainder is incubated in the ordinary way. Cultures should be kept under observation for at least twenty days. For animal inoculation the guinea-pig is most suitable and the subcutaneous route is recommended. The animals should not be killed for two or three months. In the recognition of the organism of undulant fever it should be remembered that it is usually a small Gram-negative rod or coccobacillus with a pleomorphic tendency. It does not ferment any of the carbohydrates. The blood count shows a secondary anemia with leucopenia and relative and absolute lymphocytosis. The percentage of haemoglobin may drop to 50%, the average red cell count being 3,600,000 per cubic millimetre. In twenty cases the lowest

leucocyte count was 2,400 per cubic millimetre, the average being 4,200. The highest percentage of lymphocytes observed was 78%, the average approximately 46%.

Blood Culture in Acute Polyarthritides.

EDWIN P. JORDAN AND JOHN P. BOLAND (*Journal of Infectious Diseases*, February, 1930) report the result of the study of blood cultures from thirty-two patients suffering with acute polyarthritides and from sixteen persons used as controls. The thirty-two patients ranged from nine to fifty-two years of age, twenty-nine were males and three females. The onset of illness was acute and in all but one instance multiple joints were affected. In nine the onset was associated with acute tonsillitis. The duration of illness before admission to hospital was from two days to five months. The temperature on admission ranged from 37.4° to 40° C. (99.4° to 104° F.). Signs of cardiac damage were present in fourteen of the patients. The medium used was beef infusion broth with 0.2% dextrose adjusted to pH 7.6. Twenty to twenty-five cubic centimetres of blood were collected and allowed to clot and to this one hundred and fifty cubic centimetres of the fluid medium were added. Sixty-seven culture tubes were inoculated from the thirty-two patients. Thirty-seven of these remained sterile for one month or more. Thirteen cultures from eleven patients were grossly contaminated. Sixteen cultures from twelve patients contained organisms which merited further examination. Cultures from the controls failed to yield any organisms similar to the sixteen strains studied. Eleven of the sixteen strains studied were from ten patients and showed certain resemblances. When first isolated, they grew with difficulty on sheep blood agar. The organisms were short Gram-negative bacilli; all produced acid in dextrose, none in inulin. Agglutination studies of the first four strains isolated by the use of sera obtained from rabbits each of which had been given several intravenous injections of one of these strains, demonstrated an apparent identity of three strains. The five strains not similar to those described were obtained from four patients; one was a Gram-positive bacillus, two from one patient were long Gram-positive bacilli with a few spores, one was a Gram-positive strepto-staphylococcus. The authors considered that the unusual frequency with which the minute bacillus was isolated from the blood, was worthy of note.

HYGIENE.

Occupational Skin Diseases.

H. PROSSER WHITE (*Journal of State Medicine*, October, 1929) discusses the difficulties associated with the understanding of occupational skin diseases. He points out first of all that a large number of the difficulties met with

in this subject are due to incomplete realization of the limitations as well as the powers of the allergic reaction. It has not been definitely proved that acquired or even congenital allergy can be the cause of periodically recurring eczema. Therefore, dermatologists should agree that allergy, either acquired or natural, cannot be held accountable for or continue to produce an eruption for months or years or that an eruption can appear spasmodically without fresh exposure to the allergen. In industry acquired allergy is rare. Systematic sensitization is possible only through the respiratory or digestive tracts. The chief concern of the industrial physician is with direct chemical dermatosis. Many instances of vegetable products producing anaphylactic results are known, but very few of these are met in industry. Before using the term allergy or sensitiveness, each certifier should be certain that the agent is known to produce the state and that the individual is a susceptible subject. Arsenic and certain distillation products of coal and petroleum possess a latent or long deferred activity on the skin and bring about the same changes whether taken internally or applied externally. They produce a regular series of cutaneous changes which may end in cancer. In the light of present experience neither simple trauma nor simple irritation alone can produce cancer. Specificity in injurious agents and in the tissues seems essential. The vulnerable points on the skin's surface are the follicular openings. The excretion of poisons through these channels is probably as important as the ingress. The most numerous and therefore the most important of trade skin diseases are caused by direct contact with inorganic chemical substances. Distinguishing points are the history of exposure, special distribution and short duration when the special work is stopped and treatment is correct. However, difficulty may arise in mistaking the professional for natural, idiopathic or diathetic skin disease. In reality special sensitiveness or tenderness in such cases is as a rule simply a local weakness or structural defect in the skin of the worker. Instances are quoted of chronic inflammation in a series of workers after varying periods of exposure and of an isolated case of "water-itch" in a cotton damper. In many cases which come under notice for compensation the occupation is incidental rather than consequential.

Fatigue in Industry.

CHARLES J. BOND (*Journal of State Medicine*, October, 1929) discusses fatigue in industry from two viewpoints: Environmental conditions, such as temperature, humidity, lighting *et cetera*, and certain internal factors depending on varying mental and bodily capacities of adjustment on the part of the worker and his attitude to his work. Lack of interest or boredom may be overcome in certain cases only by change of occupation. Fatigue in

industry is defined as the exhausted condition of the muscular and nervous system which is not restored by food and the night's rest, a reduced capacity for work and possibly ill health being produced. In the absence of a direct physiological test for fatigue, indirect tests must be used. Such are variations in output, sickness and mortality, labour turnover, lost time and spoilt work and frequency of accidents. Thus two factors can usually be differentiated in fatigue. The psychological group contains as one of the most important, "interest in work." Among several thousand workers in different industries in Germany from 50% to 75% were not interested in their work. Industrial efficiency depends very closely on the regulation of hours of work, spells of work and rest pauses. The Industrial Fatigue Research Board has helped to show that increase in hourly output follows on reduction in length of shift and has demonstrated the false economy of excessive hours as well as the beneficial effect of rest pauses. Matters relating to time and motion study, machinery design and methods of weight carrying have been investigated both in England and America. The influence of temperature, humidity, air movement and lighting on industrial fatigue as well as the influence of noise, vibration and dust are receiving attention as external or environmental factors in fatigue. No hard and fast line can be drawn between the two sets of factors.

Occupational Diseases of Hop-Picking.

BEATRICE M. SMITHIES (*The Lancet*, September 7, 1929) gives a description of "hop rash," "hop eye," and "hop gout," three recognized affections seen only in hop-pickers. "Hop rash" was first described in 1834. Of a total of 1,172 persons treated at the Hop-Pickers' Hospital and dispensaries at Mawen in August and September, 1928, fifty-two suffered from hop dermatitis, four being men, thirty-nine women and nine children of both sexes under fourteen. These fifty-two patients attended for treatment eighty-one times, indicating the short duration of the disease. Individual susceptibility appears to be the rule, as patients report annual recurrences. The onset is marked by a papular erythema of exposed surfaces with intense irritation and some general constitutional disturbance, headache and drowsiness. The lesions may progress to vesicles and even pustules 0.25 to 1.25 centimetres (one-tenth to half an inch) in diameter. The dermatitis is associated with scratches on the hands from the hop vines, suggesting a protein sensitization. "Hop eye" occurred in fourteen persons. Of these eleven were women and three children. The condition appears as a conjunctivitis with lachrymation and oedema of the lids and is apparently of the same origin as the rash. Seventeen were treated for "hop gout"; eleven were women and six men from twenty-nine to fifty-eight years of age. The patient complains of pain, limita-

tion of movement and acute swelling in the fingers, wrist or forearm of one side. The crepitation of a tenosynovitis is felt in the swelling. The course of the disease is short. The aetiology of these diseases is obscure.

Industry and the Handicapped.

R. B. CRAIN (*Journal of Industrial Hygiene*, October, 1929) states that the value of occupational therapy and physiotherapy was clearly demonstrated during the Great War. In 1919 there were established in the United States of America the Industrial Workshops of Rochester, conducted as an activity of the local Tuberculosis and Health Association. A division of industrial therapy was created in 1926. Patients come principally from the New York State Bureau of Rehabilitation, out-patient hospital departments, social agencies and medical practitioners. The object of the workshops is to return patients to full employment. The proceeds from the sale of goods manufactured in the first shop are divided among the patients. In the second shop which is run on the lines of a factory, the hours of work are medically supervised, the products are sold to factories and the patients are paid on an hourly basis during the first two weeks and while learning new work. Persons treated include those suffering from respiratory diseases, orthopaedic conditions, neuroses, arthritis, industrial accidents and postoperative conditions. A survey of the results of the first fifty-six patients discharged following reorganization of the shops in October, 1926, showed that 69% had returned to work and in five instances to better jobs than they previously held. Of thirty-six cardiac patients eleven had returned to work or school.

Respiratory Diseases in a Portland Cement Plant.

L. R. THOMPSON (*Journal of Industrial Hygiene*, October, 1929) has made an analysis of the morbidity statistics in a cement company's plant. He found that age had a very slight influence on the incidence of respiratory disease, physical status had slightly more and alcoholic indulgence more still. The greatest factor in this respect was length of service. Those employees leaving after short service suffered from respiratory troubles to a far greater extent than those of longer service. A more detailed analysis showed this to be due to a process of self-elimination of those who were more susceptible and who were affected by the dust. Persons working in the open in all weathers were found to show the highest disability rate from respiratory diseases and this group was followed by those exposed to the heavier concentrations of dust. Limestone dust caused more respiratory disease than cement dust. The respiratory disability rate was found to be high in emergency and general repair crews who were liable to exposure to sudden changes in the nature of their working environment.

British Medical Association News.

SCIENTIFIC.

A MEETING OF THE QUEENSLAND BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held at the B.M.A. Building, Adelaide Street, Brisbane, on March 7, 1930, Dr. S. F. McDONALD, the President, in the chair.

Malignant Disease.

DR. R. GRAHAM BROWN showed two patients illustrating aspects of malignant disease. The first was a man, aged fifty years, who had presented himself two weeks previously with what appeared clinically to be a recurrent rodent ulcer of the inner angle of the left orbit. The growth had presented a large crater with hard everted edges which involved the upper and lower lids at their inner ends and the bulbar conjunctiva. In 1926 the patient had had a small "rodent ulcer" removed from the lower lid and again in 1928 when the bulbar conjunctiva was also involved and dealt with. This had been followed by a plastic operation. At about the same time the lachrymal sac on that side had been removed.

At first sight the condition had appeared one that could be appropriately treated by radium needle implantation, but the crater, on probing, had been found to lead to the *os planum* of the ethmoid and X ray examination had demonstrated involvement of the ethmoidal cells. The left orbit after reflection of the skin of the outer halves of the upper and lower lids had been exenterated and the ethmoidal cells removed practically in their entirety. The patient was shown to illustrate the importance of knowing all details possible before instituting a line of treatment. Had radium been used for this patient the amount required would have been such as to destroy what vision there was and also a necrosis of bone, followed by a chronic suppurating sinus, would most surely have developed. It was certainly better to retain an eye, although useless, than to be without one, but in an instance such as this, where the growth had extended far, the matter resolved itself into a question of prolonging the life of the patient, not of the retention of an eye.

A section of the ulcer had been forwarded to Professor Welsh, of the University of Sydney, who had reported that the growth was a peculiar type of carcinoma and that, although clinically it was a rodent ulcer, yet microscopically it was not a basal cell epithelioma. Some cell nests were present in the precancerous area of reaction, although none was present in the invading newgrowth.

The second patient was shown to illustrate that even in apparently hopeless cases of malignant disease about the mouth, very promising results might be obtained by energetic treatment with radium and diathermy. The patient was a man, aged fifty-seven years. He had been referred to Dr. Graham Brown for radium treatment by Dr. R. A. Meek and Dr. M. Geaney. When seen in July, 1929, the man had been in an advanced state of cachexia and had practically been unable to open his mouth. His teeth and mouth had been in a filthy condition. He had been examined under an anæsthetic and the growth had been found to involve the left half of the uvula and palate, the left tonsil and base of the tongue and to extend down into the pharynx and outwards over the ascending ramus of the left lower jaw into the cheek. Radium had been implanted by means of unit needles and in all he had been given 1,670 milligramme-hours' radiation. Teeth had been subsequently removed and the patient had made 'a remarkable improvement. Later Dr. Geaney had dissected out the glands in his neck and reported that there was no microscopical evidence of cancer in the removed glands. The man had been kept under observation, particularly as it was felt that the growth had not been entirely destroyed and as a large amount of fibrosis had developed. The patient's condition had improved considerably, the uvula and palate and cheek returning to normal appearance, but it had been considered that further treatment should be given to the tongue and pharyngeal regions. Consequently a month previously diathermy had been energetically applied to these latter regions and at the

time of demonstration there was a large cavity in this region with granulations which appeared healthy, but which Dr. Graham Brown maintained should be still looked upon with grave suspicion.

The case illustrated how a man, practically at death's door, had been by the methods enumerated given a comfortable existence and had improved out of all recognition in his general state of health. Pathological examination of the specimen showed it to be a squamous epithelioma of the more matured type and which fitted in with Grade 1 of Broder's classification. The outlook was, therefore, more favourable as far as metastases were concerned than had it been of the third or fourth variety. The patient would naturally be kept under observation and it was the intention of Dr. Graham Brown to present him again at a later date for inspection.

In reply to Dr. Ken Wilson, Dr. Graham Brown said that it frequently happened that after treatment of malignant disease of the mouth by radium a definite amount of fibrosis developed. The explanation for this was probably on account of the sepsis that was usually present in the mouth in these patients. This explanation would account for the less frequent development of fibrosis in other parts of the body.

Chronic Bronchiectasis.

DR. EUSTACE RUSSELL read a paper entitled: "The Diagnosis and Treatment of Chronic Bronchiectasis" (see page 570).

DR. R. GRAHAM BROWN said that he had had much pleasure in listening to Dr. Russell's paper, not only for its substance, but also because the paper came from the pen of Dr. Russell and he wished to offer his thanks. As a rhinologist who had since 1918 been interested in the question of sinus disease and bronchiectasis and who had published several articles on the question, he welcomed the discussion of such a subject and more particularly the question of the ætiology. The rhinologist had been twitted by Dr. Russell, but he wished to suggest that at the present time he (Dr. Graham Brown) was seeing as many, if not more, of these patients than any medical specialist in the city.

There were many aspects of the question upon which he did not agree with Dr. Russell, but this could be accounted for probably by the different types of patients which came under the notice of each. There was no question in his mind as to the association of accessory sinus suppuration and bronchial and chronic lung affections and he claimed that, perhaps in Queensland, accessory sinus suppuration was more frequently the causative factor than any other and it was his duty to keep harping on it, monotonous though such repeated statements might be.

Dr. Graham Brown detailed the points in favour of the aspiration theory and he also detailed at length the work of Cutler, of Cleveland, Ohio, United States of America, who brought good evidence and argument for the embolic origin of chronic lung abscesses. Cutler had done a lot of experimental work on animals and had, he thought, proved his point. This work was being continued and for those who had not yet become acquainted with the views of this investigator he mentioned an excellent article by him in the November, 1929, issue of *The Journal of the College of Surgeons of Australasia*. The outstanding fact of the experiments was that ordinary septic pulmonary emboli did not tend to a chronic lung abscess, but when contaminated with the fusiform bacillus and the spirillum they invariably produced abscesses which tended to be chronic. This Dr. Graham Brown considered was a very important point in the ætiology of chronic bronchiectasis, so called.

The subject matter under discussion was such a large one that it was impossible to deal with all points and there were many of Dr. Russell's statements of minor importance to which he took exception. However, time did not permit of his bringing them forward. That a patient should progress to the state of clubbed fingers and all the other signs of chronic pulmonary sepsis in this class of condition was more or less a disgrace to the profession and he asked to be excused for again emphasizing the absolute importance of early diagnosis and early treatment. He maintained that it was essential in the

investigation of every chronic pulmonary suppurative condition that the nasal accessory sinuses as well as the chest should be investigated by X rays as well as by clinical means. He felt quite convinced that of the forms of bronchiectasis which the medical practitioners of Brisbane were seeing, the majority were associated with, if not caused by, chronic suppurative nasal accessory sinus conditions. These conditions were frequently found in association with the disease under discussion.

Dr. Graham Brown said that probably in no branch of medicine had so much work been done since the war as had been done on chest conditions and he considered that the leaders in this question at the present day were certain American investigators; particularly did he mention the work of the combination of Dr. Graham and Dr. Sinclair at their clinic at the Barnes Hospital, St. Louis.

Dr. Graham Brown begged members to be always suspicious of nasal accessory sinus suppuration and to exclude it whenever a patient, particularly a child, presented himself suffering from a chronic cough. He asked how was it possible to treat successfully the chronic chest condition which might be manifest only by the cough, if infective material was continually being inhaled from the upper respiratory tract or from the mouth. He pointed out how easily such an inhalation took place during sleep and how rapidly such a person improved in his symptoms and general health when such suppuration had been successfully dealt with.

In his concluding remarks he said that he wished to thank Dr. Russell again for bringing such a question before the meeting and for the excellent manner of its presentation.

Dr. W. N. ROBERTSON said that he was extremely pleased to hear Dr. Russell stressing prevention. Like Dr. Graham Brown, Dr. Robertson believed in cleaning up all the offending sinuses, but unfortunately they did not generally see these patients till the condition was well advanced. By careful inquiry into the history it was generally found that bronchiectasis started early in life, frequently from whooping cough, measles *et cetera*, where there was distension of the tubes and a mixed infection.

In regard to treatment, Dr. Robertson generally used intratracheal injections; he had had failures, but a moderate number of successes. He used injections of "Izal" and advised patients to go out to a western climate. He considered Martin's method of washing out the lung one of the most sane methods used. He stressed prevention and said that after care of pneumonia, whooping cough, measles and bronchitis would be of great assistance in this direction.

Dr. WALTER CROSSE congratulated Dr. Russell on his excellent paper and was glad he had stressed the aetiology of bronchiectasis from pneumonia and bronchopneumonia. During his time on the staff of the Children's Hospital he had been surprised at the number of bronchiectatic patients that had no sinus infection. They had to remember that antrum trouble was not necessarily always linked with bronchiectasis. He had himself recently opened both antra in a patient with bad bronchiectasis. The antra, both by X ray examination and transillumination, had appeared pathological and had been found to be normal.

He advocated the use of the sucker and intratracheal anæsthetic in any operations about the upper air passages or throat, where there might be a risk of aspiration of septic or other material. If upper respiratory infection was responsible for bronchiectasis, then he thought the tonsils and adenoids themselves might often be the cause.

Dr. ALEX MURPHY congratulated Dr. Russell especially on stressing the prevalence of this disease. He himself had found it very frequent and thought that so-called chronic bronchitis was more often mild bronchiectasis; also many conditions diagnosed as tuberculous, particularly when the lesion was basal, were also bronchiectatic. He was interested in the aetiology and considered that pulmonary fibrosis was the most important determining factor.

He found that patients with well marked bronchiectasis often suffered from intermittent attacks of fever, with night sweats and anorexia and this might lead to a diagnosis of tuberculosis.

With regard to treatment, he first requested the bronchoscopist to drain the cavities and instil "Lipiodol"; this often produced temporary improvement and he then induced artificial pneumothorax. Occasionally adhesions prevented collapse, but when it had been obtained it was very successful. Collapse was maintained for three or four months and after the first two or three weeks the patient was able to follow his occupation, provided that it did not involve hard manual labour.

Dr. E. S. MEYERS said that he had listened with pleasure to both the paper and the discussion. He thought there was one danger, that medical men might get into the habit of diagnosing bronchiectasis more frequently than it really existed. If the aspiration were not really due to gravity, he wondered whether hanging the patient up by the feet would be very successful.

He was interested in Dr. Russell's remarks on the surgical treatment of the disease; so far he knew of only one physician who had sent a patient with bronchiectasis for phrenic avulsion.

Dr. S. F. McDONALD said that the question of aetiology had been gone into on a large scale ten to twelve years before in the American military camps. There had been epidemics of measles and influenza. *Post mortem* examinations had been done and full particulars of every kind obtained.

It had been found that in strong young adults bronchiectasis was extraordinarily common. It began as early as the seventh day and was well developed by the twelfth day. Large cavities had been diagnosed and verified by *post mortem* examinations, even in patients dying on the twenty-seventh day.

There had been found: (i) Damage to the columnar epithelium, then the commencing expansion and stretching of the bronchiole; (ii) cracks and fissures in the deeper tissues. Then the tubes began to fill up with an accumulation of exudate, serous, fibrous and purulent, and the pressure of the exudate tended to stretch the tubes further. It had been proved that this was not due to coughing, as in coughing the pressure was the same throughout the lung, but that it was the pressure inside of a collection of fluid on damaged epithelium. This damaged columnar epithelium was replaced by stratified epithelium which could not get rid of the secretion like the former, and these smooth-walled tubes filled up gradually. Many of the patients died, others went on to unresolved pneumonia and bronchiectasis, the greater number of cases following influenza. The same process occurred in a child following measles and whooping cough.

In regard to sinus infection, in the investigation of bronchiectasis by Finlay, of Glasgow, who held that the only sure method of diagnosis was by "Lipiodol" injection, it was stated emphatically that no connexion was found between bronchiectasis and sinus infection. The connexion of bronchiectasis with influenza had been noticed sixty years before. In the great majority of cases Dr. McDonald considered that basal pulmonary tuberculosis, without tubercle bacilli in the sputum, was bronchiectasis. He considered Dr. Russell had summed up most admirably the question of the disease and its prophylaxis.

Dr. Russell in reply said he was grateful for the criticism. He wished to point out that his paper was on the diagnosis and treatment of bronchiectasis and not the pathology nor the aetiology. He had read an unpublished analysis of various kinds of pulmonary abscesses by Dr. William Evans, of the London Hospital, which was a very comprehensive work, and he did not think that bronchiectasis was due to embolism as had been suggested. Dr. Russell thought that almost every patient with bronchiectasis had a history of some acute pneumonic illness. Dr. Graham Brown had mentioned the direct injection of "Lipiodol," but this was not new. Martin injected the "Lipiodol" directly into the affected part.

Dr. Robertson had spoken of the treatment he had used for bronchiectasis and the success he had had. It was necessary to be absolutely certain of the diagnosis in these cases by the use of "Lipiodol" and X rays before claiming the patients as cured. It was necessary to be certain of deformity of the tubes.

In reply to Dr. Alexander Murphy, Dr. Russell considered that further investigation was needed into the ætiology of the disease. He himself had found non-tuberculous cavities in the apex of the lung and tuberculous cavities at the base. He estimated that 50% of all bronchiectatic cavities were tuberculous.

In treatment by artificial pneumothorax a very supple bronchial wall was necessary for success.

Most patients with bronchiectasis had exacerbations of fever and this was what caused the patient to seek advice.

In reply to Dr. Meyers, Dr. Russell said he considered that the treatment of bronchiectasis was fast becoming more surgical than medical.

Medical Societies.

THE NEW SOUTH WALES MEDICAL UNION.

DR. E. S. LITTLEJOHN, the Honorary Treasurer of the New South Wales Medical Union, has requested us to

publish the Balance Sheet as at February 28, 1930, and the Revenue and Expenditure Account for the year ended February 28, 1930. Both these financial statements will be found hereunder.

Post-Graduate Work.

POST-GRADUATE COURSE AT BRISBANE.

A POST-GRADUATE COURSE will be held in Brisbane from Monday, June 2, to Friday, June 6, 1930, under the auspices of the Queensland Branch of the British Medical Association.

The fee for the course will be two guineas, including a double ticket for the dance and bridge party to be held on Monday, June 2.

Intending members are asked to notify the Honorary Secretaries as soon as possible and to mention whether they will be accompanied by their wives. The Joint

Balance Sheet as at February 28, 1930.

LIABILITIES.		£	s.	d.	£	s.	d.
Capital Account as at March 1, 1930	15,150	19	8				
Add Surplus for the Year ended February 28, 1930, as per Revenue and Expenditure Account ..	647	6	8				
					15,798	6	4
Sundry Creditor					9	11	7
					£15,807	17	11

ASSETS.		£	s.	d.	£	s.	d.
Cash Accounts—							
Government Savings Bank of New South Wales—							
Martin Place	180	18	1				
Current Account	905	18	0				
Barrack Street	19	13	10				
						1,106	9 11
Investments—							
Commonwealth Inscribed Stock, 5½%, 1933	8,300	0	0				
Commonwealth Funded Stock, 5½%, 1941	700	0	0				
New South Wales Government Stock, 5½%, 1941	2,800	0	0				
New South Wales Government Stock, 5½%, 1938	1,600	0	0				
New South Wales Government Stock, 5½%, 1934	501	8	0				
New South Wales Government Stock, 3%, Interm.	300	0	0				
First Rural Bank Loan, 5½%, 1933	500	0	0				
						14,701	8 0
						£15,807	17 11

Revenue and Expenditure Account for Year ended February 28, 1930.

	£	s.	d.
To Rent (British Medical Association)	30	0	0
„ Secretary, Honorarium	250	0	0
„ Treasurer, Honorarium	200	0	0
„ Assistant Secretary	200	0	0
„ Legal Expenses	1,370	2	5
„ Printing and Stationery	63	1	9
„ Stamps, Bank Exchange and Charges	54	6	5
„ Income Tax (Federal)	75	10	7
„ Income Tax (State)	3	19	0
„ Audit Fees	29	8	0
„ Surplus Transferred to Capital Account	647	6	8
	£2,923	14	10

	£	s.	d.
By Subscriptions	2,043	6	0
„ Entrance Fees	108	3	0
„ Interest Received from Investments	772	5	10
	£2,923	14	10

E. S. LITTLEJOHN,
Treasurer.

I have examined the above Balance Sheet and relative Revenue and Expenditure Account, comparing them with the books, documents and vouchers submitted for my inspection, and hereby certify that such Balance Sheet is, in my opinion, a full and fair one, so drawn up as to exhibit the position of the Union as shown by the books.

38, Martin Place, Sydney.
5th March, 1930.

E. A. TYLER, F.I.A.A.,
Public Accountant.

Honorary Secretaries are Dr. Neville G. Sutton and Dr. Keith Ross, B.M.A. Building, 35, Adelaide Street, Brisbane. The programme of the post-graduate course is as follows:

Monday, June 2, 1930.

- 9 a.m.—Registration.
 10.30 a.m.—"Fractures of Femur," Dr. G. A. C. Douglas, at the Brisbane Hospital.
 Afternoon.—Radium Clinic, Brisbane Hospital.
 8 p.m.—Dance and Bridge Party, Carlton Cabaret (which has been reserved exclusively).

Tuesday, June 3, 1930.

- 9 a.m.—Operations by Mr. Alan Newton, at the Mater Misericordiae Hospital.
 3 p.m.—Lecture by Mr. Alan Newton, "Surgery of the Upper Abdomen," Geology Theatre, Queensland University.
 8.15 p.m.—Lectures, Dr. S. V. Sewell, Geology Theatre, University—
 1. "Medical Aspects of Head Injuries."
 2. "Indications for Pneumothorax in Pulmonary Tuberculosis."

Wednesday, June 4, 1930.

- 9 a.m.—Operations by Mr. Alan Newton, at the Brisbane Hospital.
 3 p.m.—Demonstration by Dr. S. V. Sewell on neurological cases, at the Mater Misericordiae Hospital.
 8.15 p.m.—Lecture, Mr. Alan Newton, "Surgery of the Upper Abdomen," at the Geology Theatre, University.

Thursday, June 5, 1930.

- 9 a.m.—Operations by Dr. R. Gordon Craig, at the Brisbane Hospital.
 3 p.m.—Demonstration on heart cases, by Dr. S. V. Sewell, at the Brisbane Hospital.
 7.15 p.m.—Annual dinner of the Queensland Branch of the British Medical Association.

Friday, June 6, 1930.

- 9 a.m.—Operations by Dr. R. Gordon Craig, at the Mater Misericordiae Hospital.
 3 p.m.—Discussion, Mr. Alan Newton, "Surgical Experiences," at the Geology Theatre, University.
 8.15 p.m.—Bancroft Memorial Lecture, by Dr. R. Gordon Craig, "Progress in Prostatic Surgery" (with film demonstration), at the Geology Theatre, University.

The metropolitan hospitals will be open to visiting members. Arrangements may be made for members to see any particular conditions in which they are specially interested, by informing the Honorary Secretaries beforehand.

The annual dinner of the Branch will be held at Rowe's Banquet Hall and the subscription will be one guinea.

Correspondence.

THE ÆTIOLOGY OF RODENT ULCER.¹

SIR: In regard to the discussion whether rodent ulcer can be caused by trauma, the Committee of the New South Wales Branch of the British Association of Dermatology has given me permission to publish the proceedings of their meeting, held on March 13, 1930, at which I showed two further cases of rodent ulcer due to injury. My first case was that of a man with a rodent ulcer about the centre of the thoracic region of the back, due to his being washed against and cut by shells attached to a concrete wall at Bondi Baths. The second case was that of a young man who first developed his growth at the age of twelve, now healed, following a kick in the face whilst playing football. A lantern slide of a patient with a triangular

rodent ulcer of the forehead, due to a scratch from a pin and previously described, was also shown.

The following is a verbatim report of those who spoke on this subject.

Dr. Langloh Johnston: I saw the case of a boy of seventeen, also a case of a girl of nineteen, with rodent ulcers due to injury, where there was no suggestion of keratosis. I think when seeing such a large number of these cases, we cannot help but be struck by their histories of injuries followed by these rodent ulcers. I think the most striking example is that caused by the pin. The shape of it is enough to prove that it was due to injury. The case of Dr. Paul's with a rodent ulcer of the back seems to be a definite case caused by injury; in this patient there are no keratoses to be seen anywhere.

Dr. Hamilton: In regard to trauma, I think it must be regarded as something more than coincidence when in nearly every case the history traces back to some sort of injury. I am sorry I was not able to show you the case of a boy who fell off a bicycle and barked his knee. A tumour developed. We had this excised and sent to the pathological department, their report being rodent ulcer. His was a striking case of an injury which developed into a rodent ulcer. Surely it can scarcely be coincidence when a woman tells you that she has been bitten by a cockatoo on the side of the face and on this site a growth appears. Then you have the case of a man working on the wharves where he has been hit by a crane, which definite injury results in a rodent ulcer where the injury was sustained. I think the thing is so common that it is ridiculous to discuss it at all. At all events, all of us at Sydney Hospital are agreed that trauma can be one of the causes of rodent ulcer.

Dr. Lindeman: I agree with Dr. Johnston and Dr. Hamilton in these matters. After all, the face and the hands are the most frequently exposed to injury of any part of the body. The face from shaving, perhaps slight injuries from the razor and that sort of thing, which might result quite easily in rodent ulcers. Another extraordinary thing is the absence of rodents on the shoulders and those parts of the arms which are exposed most to the sun. In surf bathers, which has been a common practice here for the last twenty-five years, one very rarely sees a rodent on the shoulders. I saw a case of a girl who had a definite rodent ulcer of the breast. This was started by an accident with a safety pin. Then I had another case quite recently of a miner, practically working underground all day, a dark, swarthy skinned fellow, who had been hurt by a lump of coal falling on his head. It was a superficial cicatrizing rodent when I saw it, but nevertheless the history of injury was very definite in regard to it. I agree with Dr. Paul's submissions. I think there is definite history of injury and that his cases are definite rodents. I certainly think a lot of these rodent ulcers start with injuries, many more than the text books ascribe to them.

Dr. Dawson: I quite agree. I have seen cases that I am satisfied have been caused by trauma. I have in mind a man whom I saw, who was a miner from the south coast. He had an irregular linear rodent on his forearm and the history was that it had been caused from a scratch whilst getting through a barbed wire fence. There was another case which Dr. Raffan and I saw at Royal Prince Alfred Hospital, in which the history was a scratch. These patients showed no keratotic condition at all. With regard to Dr. Paul's cases, I think the patient whose injury was due to a pin scratch, and the one who was injured on the back at Bondi Baths, bear the theory out.

Dr. Raffan: I think we all agree that trauma can be the cause of such cases, because we have all seen so many of them, apparently directly following the injury. One sees cases of keratosis where people have been particularly exposed to the sunshine, especially in the dry, inland parts, where the irritation of the sun, wind and weather is probably acting as a predisposing traumatic agent in a similar fashion. I think I can

¹ This correspondence is now closed.—EDITOR.

agree with most of the remarks that have been made by all present.

Dr. J. Witton Flynn: I certainly agree from the photos and patients that have been shown, that the case for injury has been made out very well. I myself have three or four cases I can call to mind that have been caused by injury. There is the case of a young girl from Warren who met with an accident at the age of eighteen whilst out riding. She was injured by the buckle of the stirrup strap. There was no doubt in my mind as to the injury being the cause. I feel quite certain that rodent ulcers can be caused by trauma, and not only can be, but are caused by trauma.

The above are the expressed opinions of members of the highest tribunal on dermatology in this State and it seemed fitting that their views should be recorded.

Yours, etc.,

NORMAN PAUL.

143, Macquarie Street.
April 19, 1930.

Obituary.

ALBERT EDWARD BRADY.

We regret to announce the death of Dr. Albert Edward Brady which occurred at Sydney on April 29, 1930.

Corrigendum.

OUR attention has been called to an error in the paper by Dr. A. Bolliger and Dr. K. Maddox in the issue of April 19, 1930. On page 518 in the second conclusion the word "as" has been omitted before "with human beings." The corrected sentence will read: "'Avertin' is a reasonably safe and non-toxic anæsthetic, but as with human beings the margin of safety" *et cetera*.

Diary for the Month.

- MAY 6.—New South Wales Branch, B.M.A.: Organization and Science Committee.
MAY 6.—New South Wales Branch, B.M.A.: Post-Graduate Work Committee.
MAY 6.—New South Wales Branch, B.M.A.: Hospitals Committee.
MAY 7.—Victorian Branch, B.M.A.: Branch.
MAY 8.—New South Wales Branch, B.M.A.: Clinical Meeting.
MAY 8.—Victorian Branch, B.M.A.: Council.
MAY 9.—Queensland Branch, B.M.A.: Council.

Medical Appointments.

Dr. H. G. Caulfield (B.M.A.) has been appointed Medical Officer of Health by the Dowerin Road Board, Western Australia.

Medical Appointments Vacant, etc.

FOR announcements of medical appointments vacant, assistants, *locum tenentes*, sought, etc., see "Advertiser," page xviii.

BROKEN HILL AND DISTRICT HOSPITAL, NEW SOUTH WALES: Temporary Resident Medical Officer.

CHILDREN'S HOSPITAL, INCORPORATED, PERTH, WESTERN AUSTRALIA: Junior Resident Medical Officers.

MARYBOROUGH HOSPITALS BOARD, QUEENSLAND: Junior Resident Medical Officer.

TOOWOOMBA HOSPITALS BOARD, QUEENSLAND: Resident Medical Officer.

THE UNIVERSITY OF SYDNEY: Pathologist.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 21, Elizabeth Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company, Limited. Phoenix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australasian Prudential Association Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Members accepting appointments as medical officers of country hospitals in Queensland are advised to submit a copy of their agreement to the Council before signing. Brisbane United Friendly Society Institute. Mount Isa Hospital.
SOUTH AUSTRALIAN: Secretary, 207, North Terrace, Adelaide.	All Lodge Appointments in South Australia. All Contract Practice Appointments in South Australia.
WESTERN AUSTRALIAN: Honorary Secretary, 65, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
NEW ZEALAND (Wellington Division): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

Medical practitioners are requested not to apply for appointments to positions at the Hobart General Hospital, Tasmania, without first having communicated with the Editor of THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to "The Editor," THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: MW 2651-2.)

SUBSCRIPTION RATES.—Medical students and others not receiving THE MEDICAL JOURNAL OF AUSTRALIA in virtue of membership of the Branches of the British Medical Association in the Commonwealth can become subscribers to the journal by applying to the Manager or through the usual agents and book-sellers. Subscriptions can commence at the beginning of any quarter and are renewable on December 31. The rates are £2 for Australia and £2 5s. abroad *per annum* payable in advance.